

GERMAN HELICOPTERS

1928-1945

SCHIFFER
MILITARY
HISTORY

Focke-Achgelis Fa 223

THIS POSTMA

Heinz J. Nowarra



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Opposite page: the first really flyable helicopter in the world, the Focke-Wulf Fw 61.

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Sources

Liptrot, *Rotating Wing Activities in Germany During the Period 1939-1945*.

Kens-Nowarra, *Die deutschen Flugzeuge 1933-1945*.

Nowarra, *Die deutschen Hubschrauber*.

Photo credits:

Fokker-VFW archives

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Translated from the German by Dr. Edward Force,
Central Connecticut State University.

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Library of Congress Catalog Number: 90-62988.

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Printed in the United States of America.
ISBN: 0-88740-289-5

This book originally published under the title,
Die deutschen Hubschrauber 1928-1945,
by Podzun-Pallas Verlag, GmbH 6360 Friedberg (Dorheim),
© 1980. ISBN: 3-7909-0138-5.

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Published by Schiffer Publishing, Ltd.

1469 Morstein Road

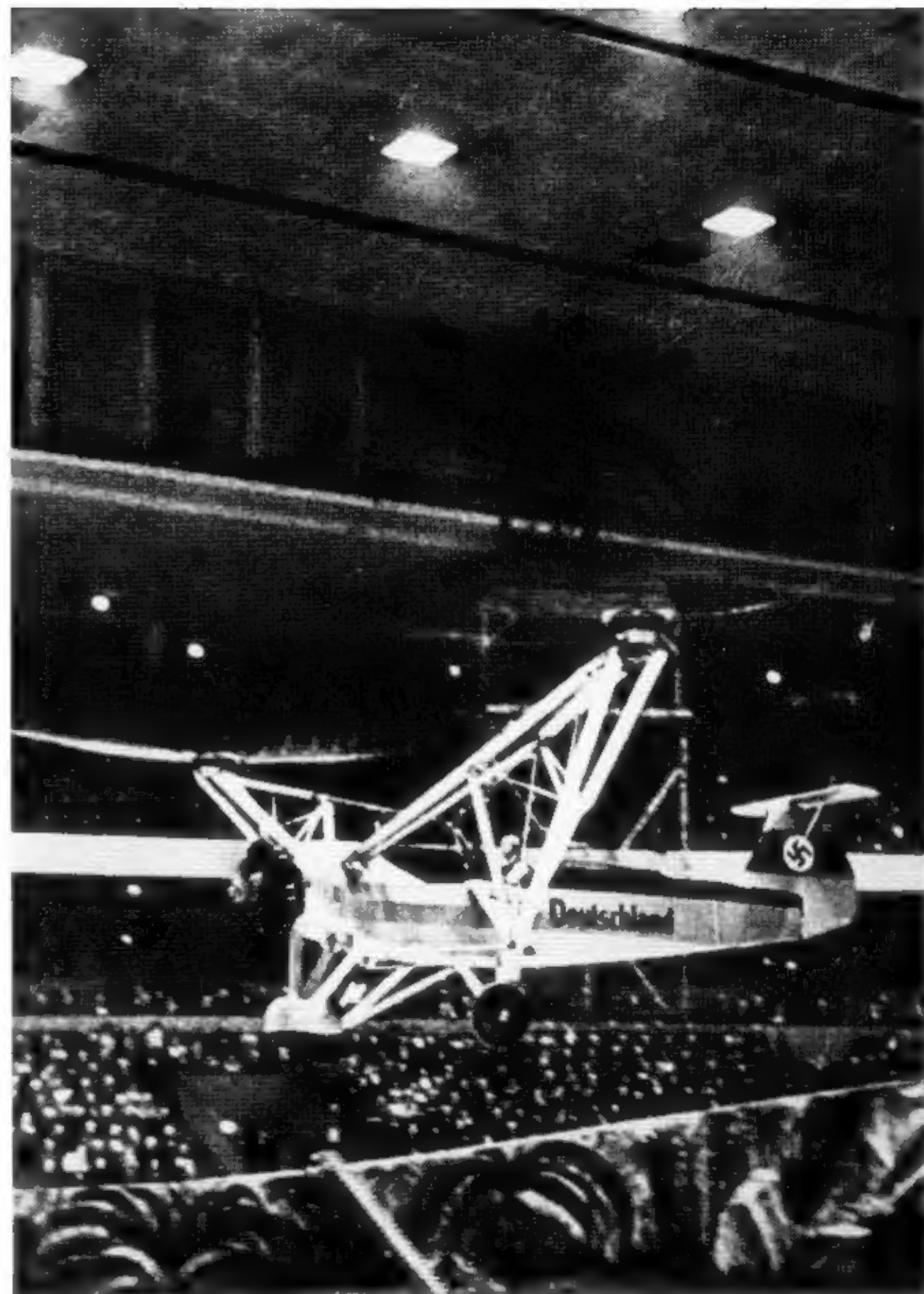
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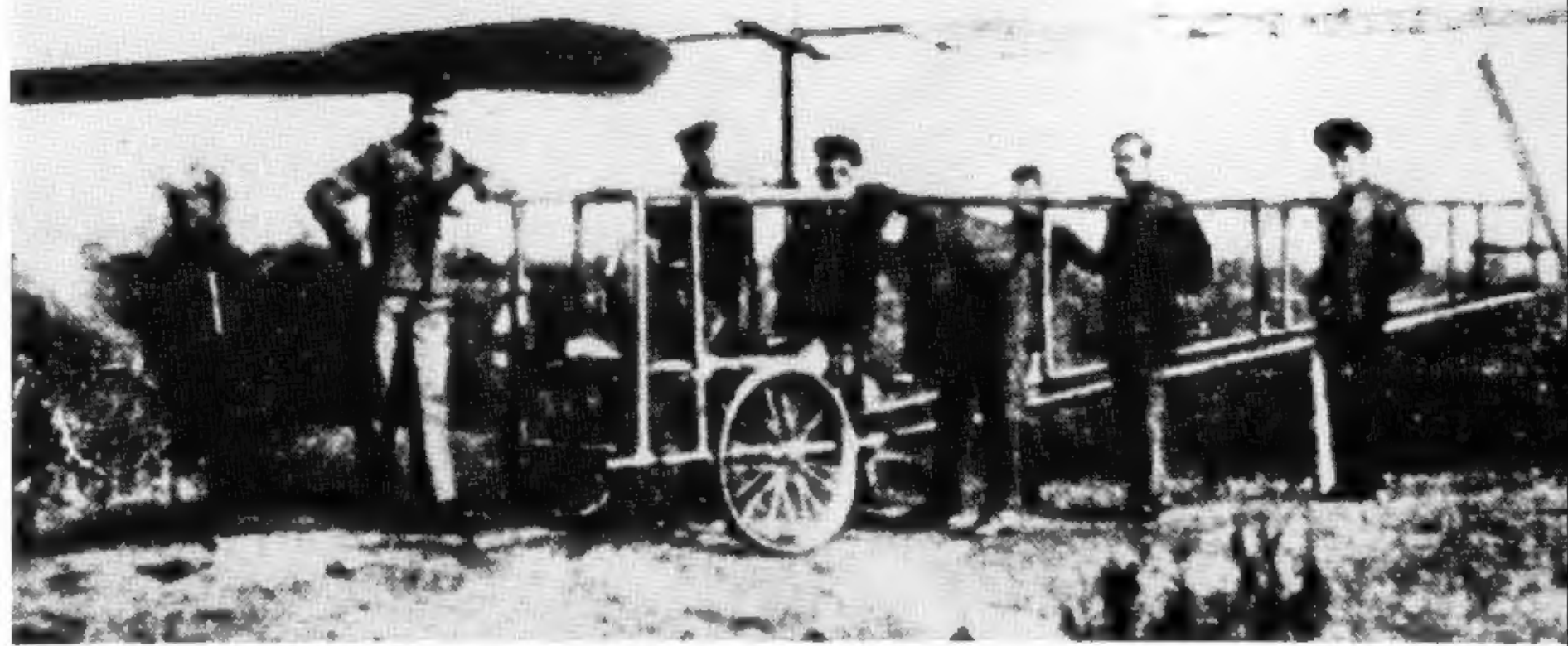


Hanna Reitsch flying the Fw 61 V 2 in February of 1938, in the Deutschland Hall in Berlin.

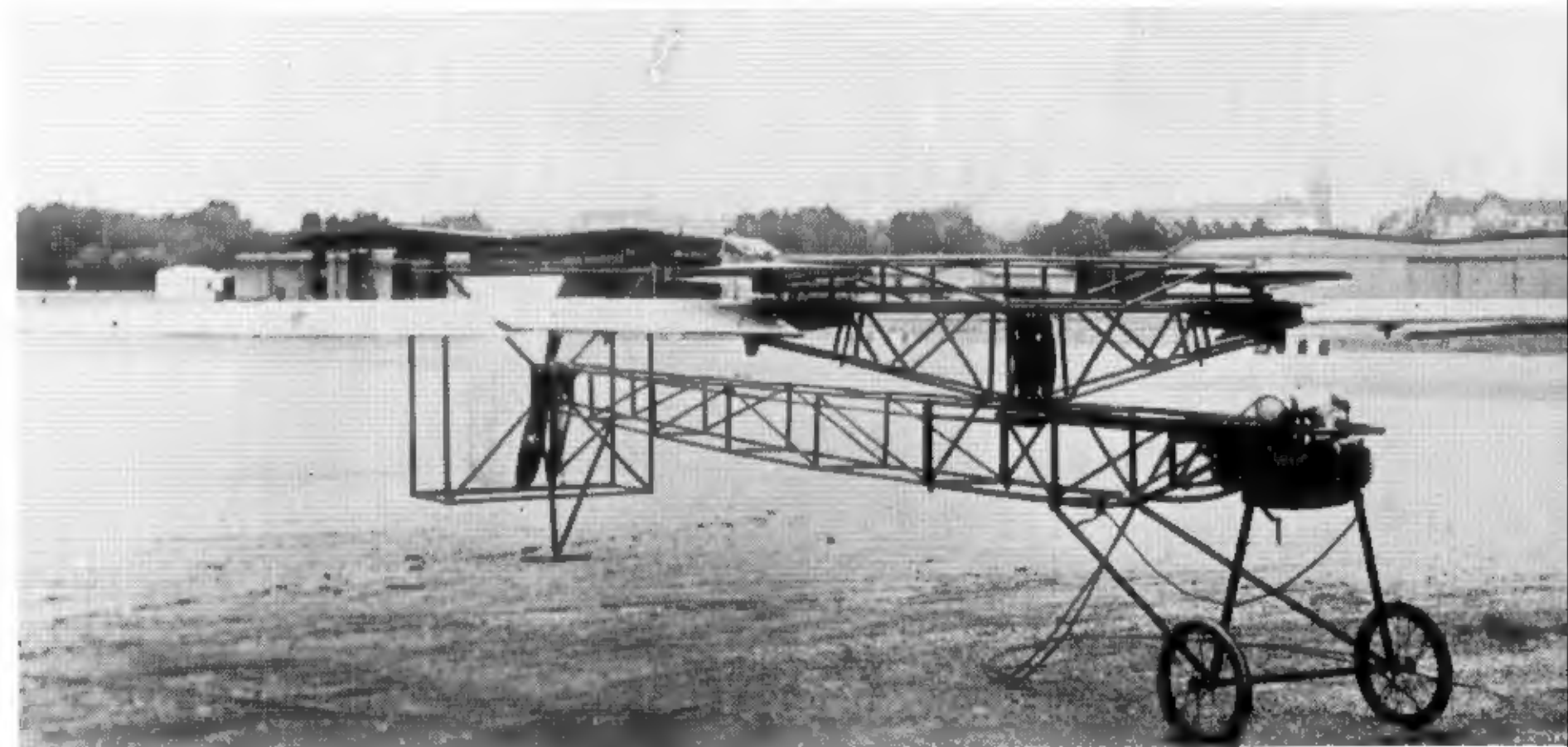
The Development of the German Helicopter to 1945

The history of the helicopter began in 1904, when the Russian scientist, Professor Zhukovski, published a study under the title "Lifting Payloads by Turning Wings." The result of this was that helicopter development was confined exclusively to Russia before World War I. It was connected particularly with the names of Yuryev and Sikorsky.

In Germany, Baumgärtel constructed a helicopter with coaxial opposed rotors in 1913-14, but it never progressed beyond short hops into the air. World War I interrupted further development. In 1927 Anton Flettner, who had made a name for himself with various inventions in the field of airflow technology, began to take up the concept of a helicopter. He created a design with one large rotor at whose ends 20-horsepower motors were mounted, with small airscrews to keep the large rotor in motion. The machine actually lifted off the ground, but was then destroyed beyond salvation by a sudden gust of wind. Flettner broke off his experiments but did not give up the idea. In 1928 Zaschka carried out experiments with a two-rotor helicopter at Tempelhof Airport in Berlin, but they were not successful.



Yuryev's 1912 helicopter already shows the typical characteristics of a modern helicopter: the main rotor forward, the stabilizing screw at the rear.



Zaschka's screw helicopter at Tempelhof, Berlin, in 1928.



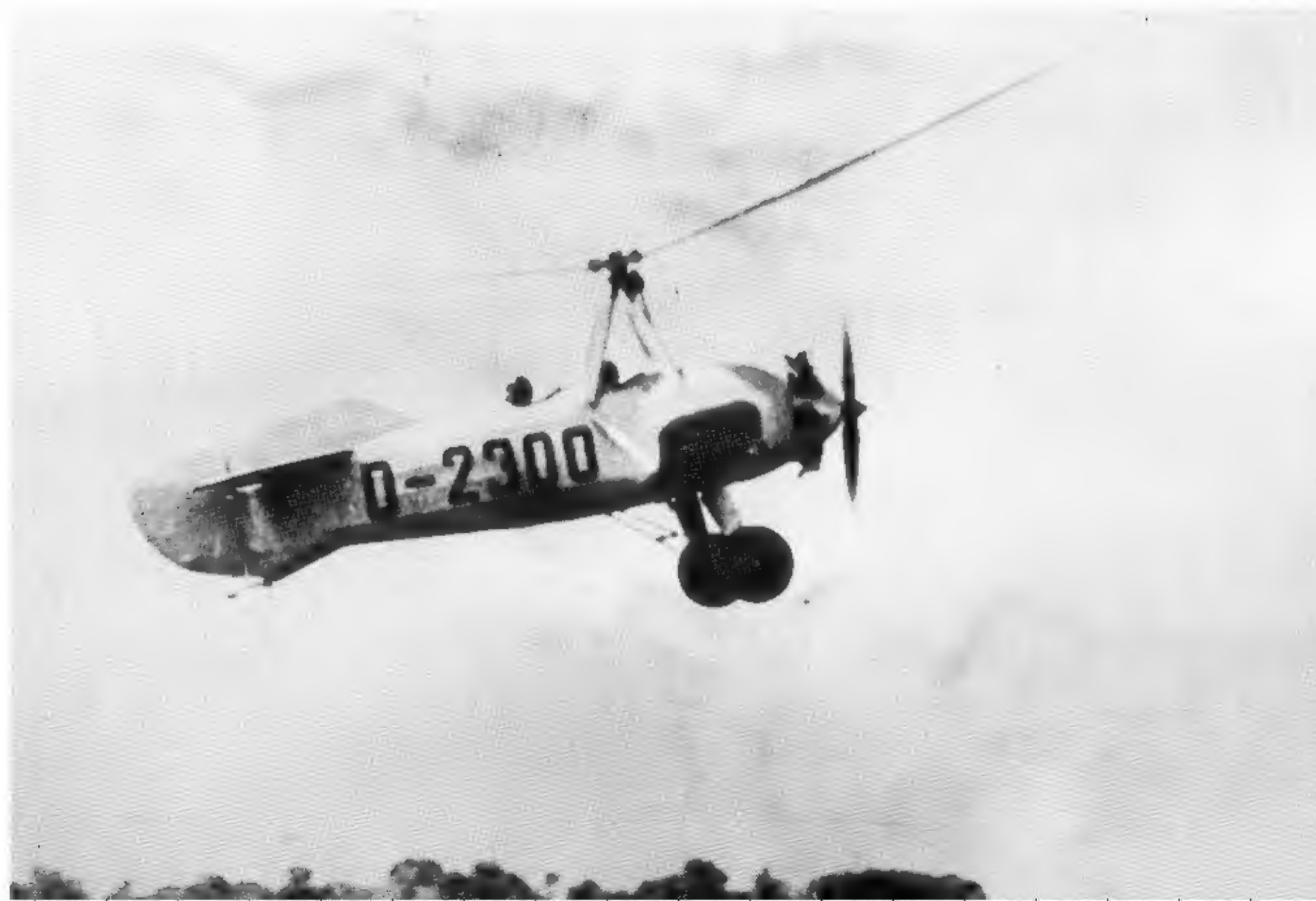
In Spain, Juan de la Cierva had tackled the problem from another angle and developed the so-called "gyroplane", which he called an "autogiro." On March 31, 1923 Lieutenant Lorga of the Spanish Air Force made the first successful flight with this "autogiro", covering 17 kilometers between Getafe and Cuatro Vientos. De la Cierva then went to England and worked on successfully. There the de la Cierva C 19 gyroplane was created, which was to provide the impetus for German helicopter development. The firm of Focke-Wulf took up construction of the C-19 Mark IV under license. Professor Heinrich Focke, the technical director of the firm, now worked intensively on it. The Focke-Wulf C-19 was built with a German Sh 14b engine of 150 horsepower, nicknamed "Don Quixote." In 1933 he began to build the improved Type C-30 gyroplane, the "Focke-Wulf C-30A Grasshopper", also equipped with an Sh 14b engine. Out of it Professor Focke developed (1937-38), in competition with the short-takeoff Siebel Si 201 and Fieseler Fi 156 "Stork", the Fw 186 V 1 gyroplane, D-ISTQ, which was given up in favor of the Fi 156. Within the Focke-Wulf company in 1931 Focke had founded a research institute that was to form the nucleus of the later firm of Focke-Achgelis & Co., which specialized in helicopter production.

Meanwhile, Engineer R. Schmidt of the Allgemeine Elektrizitätsgesellschaft (AEG) had been working since 1933 on a helicopter that was intended for use as a captive observation platform that could be built onto a truck. It was a device with two coaxial opposed airscrews driven by electric motors of 50, later 100 and 200 horsepower. Lift ranging from 450 to 1250 kilograms was attained. But it was never used by the armed forces.

The first gyroplane built by Focke-Wulf, type de la Cierva C 19.



Left:
The Focke-Wulf C-19
before its first takeoff in
Bremen. In the left
background, wearing a
hat, is Heinrich Focke.



Right:
The Focke-Wulf C-19, D-2300,
during testing.

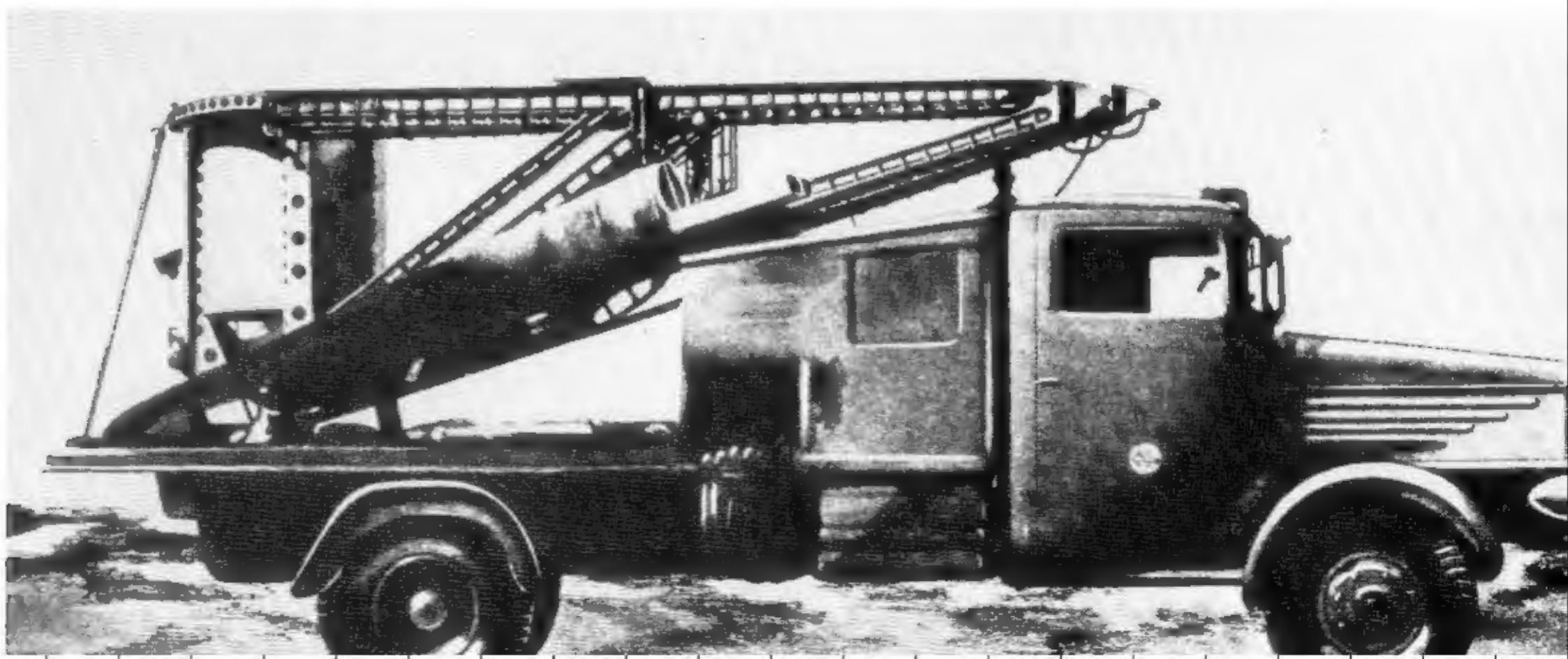
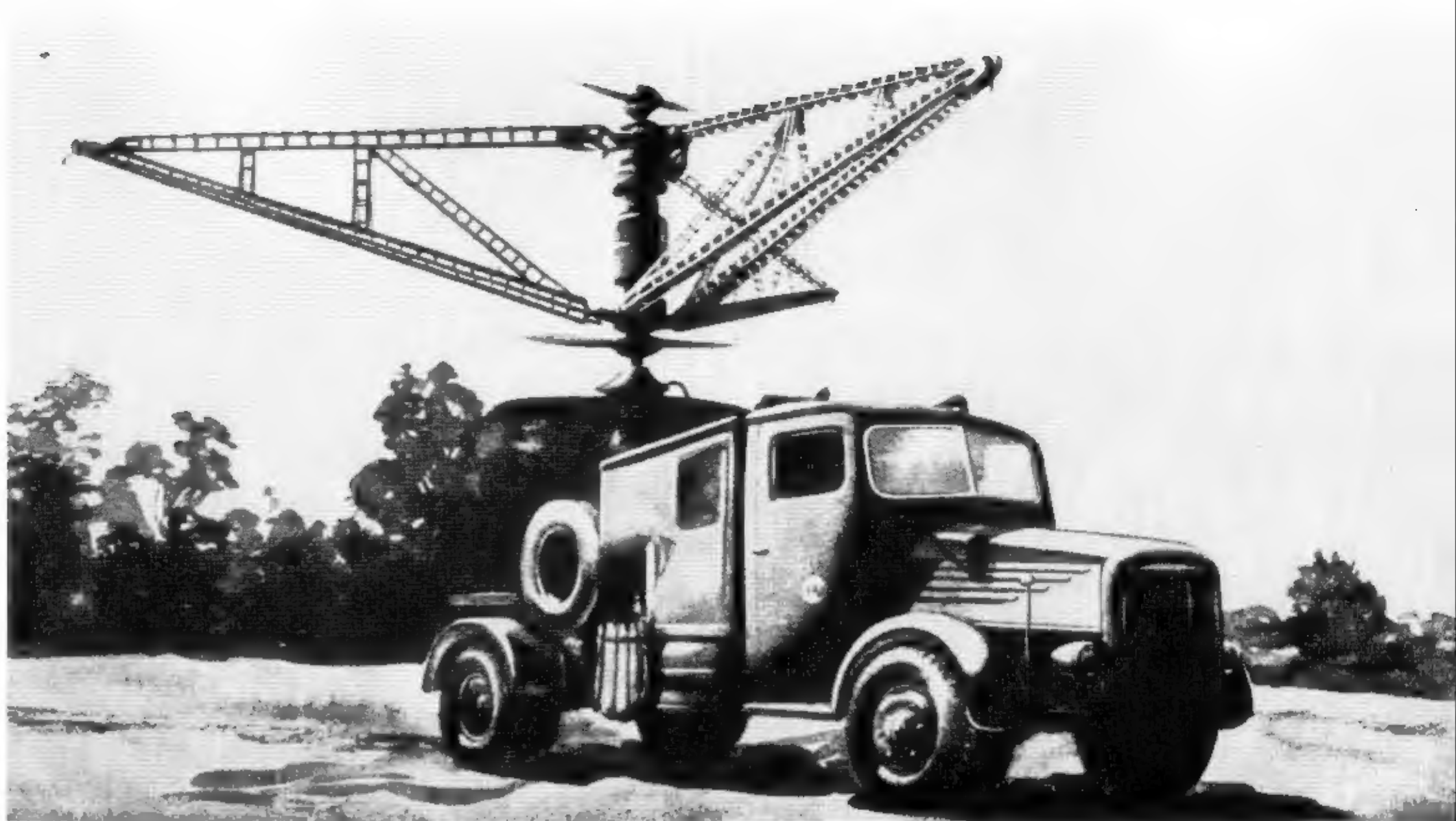


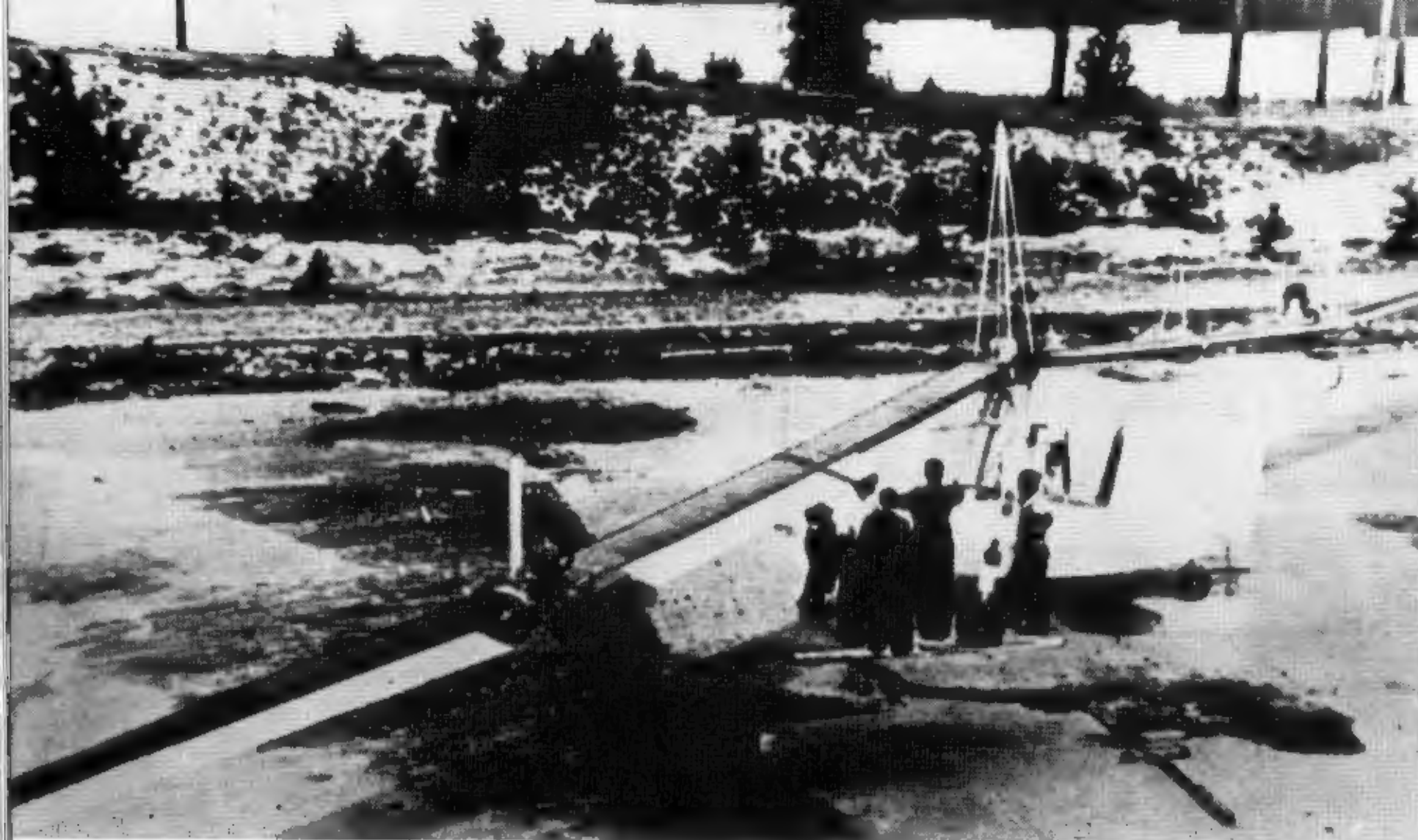
The Focke-Wulf (de la Cierva) C 30
V 1, D-EKOP.



The Focke-Wulf Fw 186
V 1 gyroplane, D-ISTQ.

The AEG helicopter was unmanned and intended for testing as an attached device. The upper picture shows the device ready for use, the lower one shows it folded up for transportation.





In 1935 Flettner built a factory in Berlin-Johannisthal at which ship-based helicopters were to be built to German Navy orders. Here the F1 184 gyroplane was built in 1935, with a 150-HP Sh 14a motor and a three-bladed rotor of 12-meter diameter, but it was not satisfactory. In 1936 Flettner began to design a helicopter whose prototype F1 185 V 1, D-EFLT, was finished in the same year. It had approximately the same dimensions as the F1 184, but was a disappointment for everyone. While he was still working on the development of a new type (F1 265), Focke progressed beyond him with the successful Fw 61 of 1937.

F1 185

Above:
Flettner's first experimental helicopter shortly
before its first takeoff.

Right:
Flettner's F1 184 V 1 was in no way superior to the
Focke-Wulf C 19.





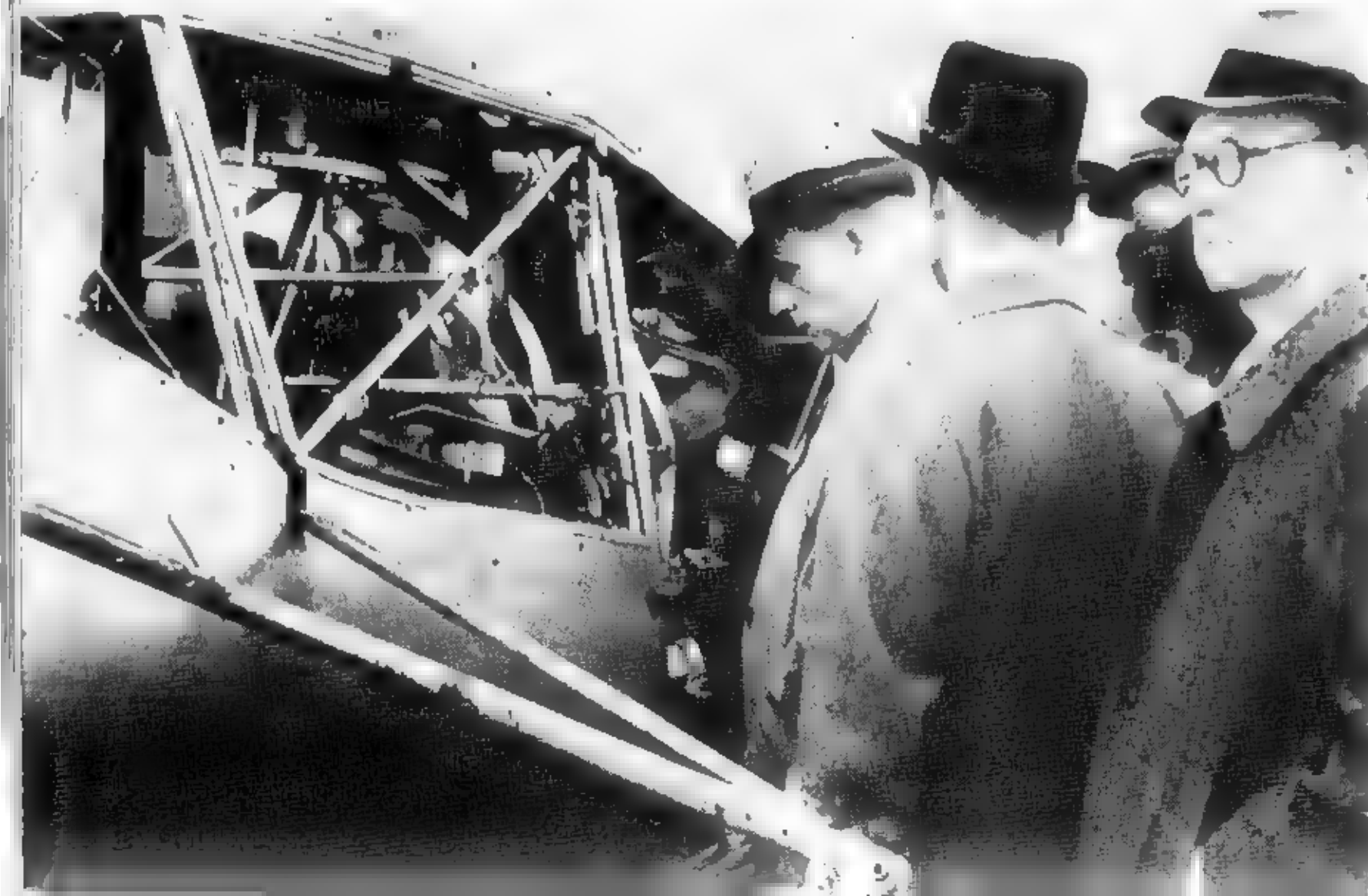


Upper left:
Air Ordnance Inspector General Udet (fourth from left) at a flight display of the F1 265 V 1.

Above:
Another picture of the same event; Flettner is second, Udet third from left.

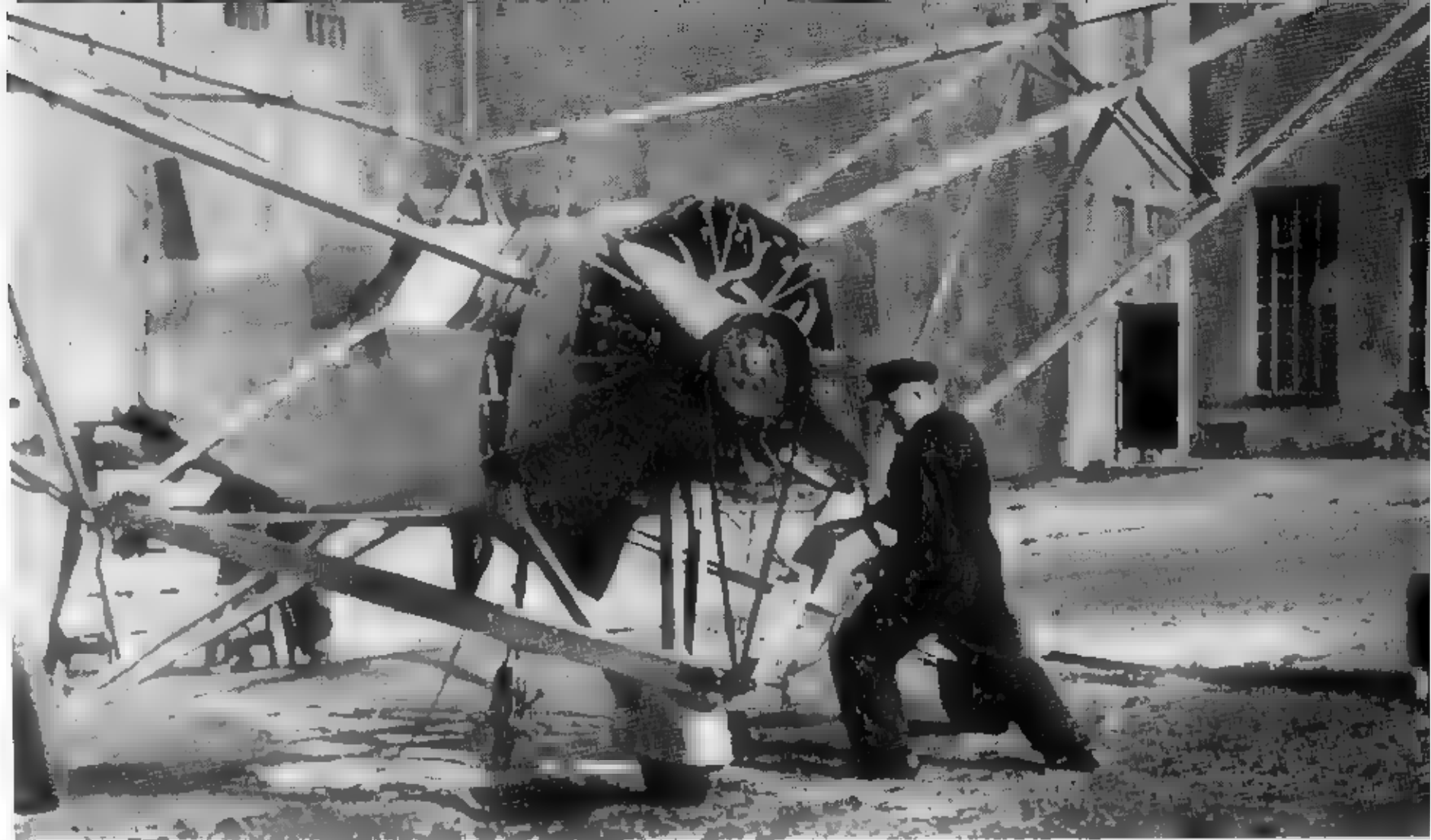
Left:
Udet in the pilot's seat of the F1 265 V 1.

Below right page:
The Flettner FI 185 V 1, D-EFLT, on a test flight.



Fw 61

With the collaboration of Dr. Jäckel, Dr. Just, Dr. Ing. Schweym and Dipl. Ing. Spanger, the first really serviceable helicopter in the world, the Focke-Wulf Fw 61, was created in six years of work (1931 to 1937). Here too, the Siemens Sh 14b motor, with its power increased to 165 HP, served as the powerplant. Its airframe was the fuselage of the Fw 44 "Stieglitz" training plane. At each side of the fuselage a boom in triangular form was mounted, carrying one of the two rotor heads at its tip. Each of the three-bladed rotors had a diameter of 7.5 meters, so that the entire device had a span of some 15 meters. Two prototypes were built: Fw 61 V 1, D-EBVU, and V 2, D-EKRA. Both were flown successfully by Edgar Rohlfs, Karl Bode and Flight Captain Hanna Reitsch. Later on, Dipl. Ing. Karl Franke of the Rechlin test center joined in. Hanna Reitsch and Franke kept discovering new capabilities of the Fw 61, which led to Hanna Reitsch flying the Fw 61 publicly in a closed building, the Deutschland Hall in Berlin, as part of a "show." It must be noted, though, that the spectators did not at all understand what had been accomplished. But experts inside and outside Germany knew all the better what kind of progress Germany had made in this area. With the Fw 61, Germany broke all records for helicopters.



Above: Preparing the Fw 61 V 1, D-EBVU, for takeoff on its first flight. The small airscrew served only to cool the motor. The first flights of the Fw 61 V 1 were made as captive flights.





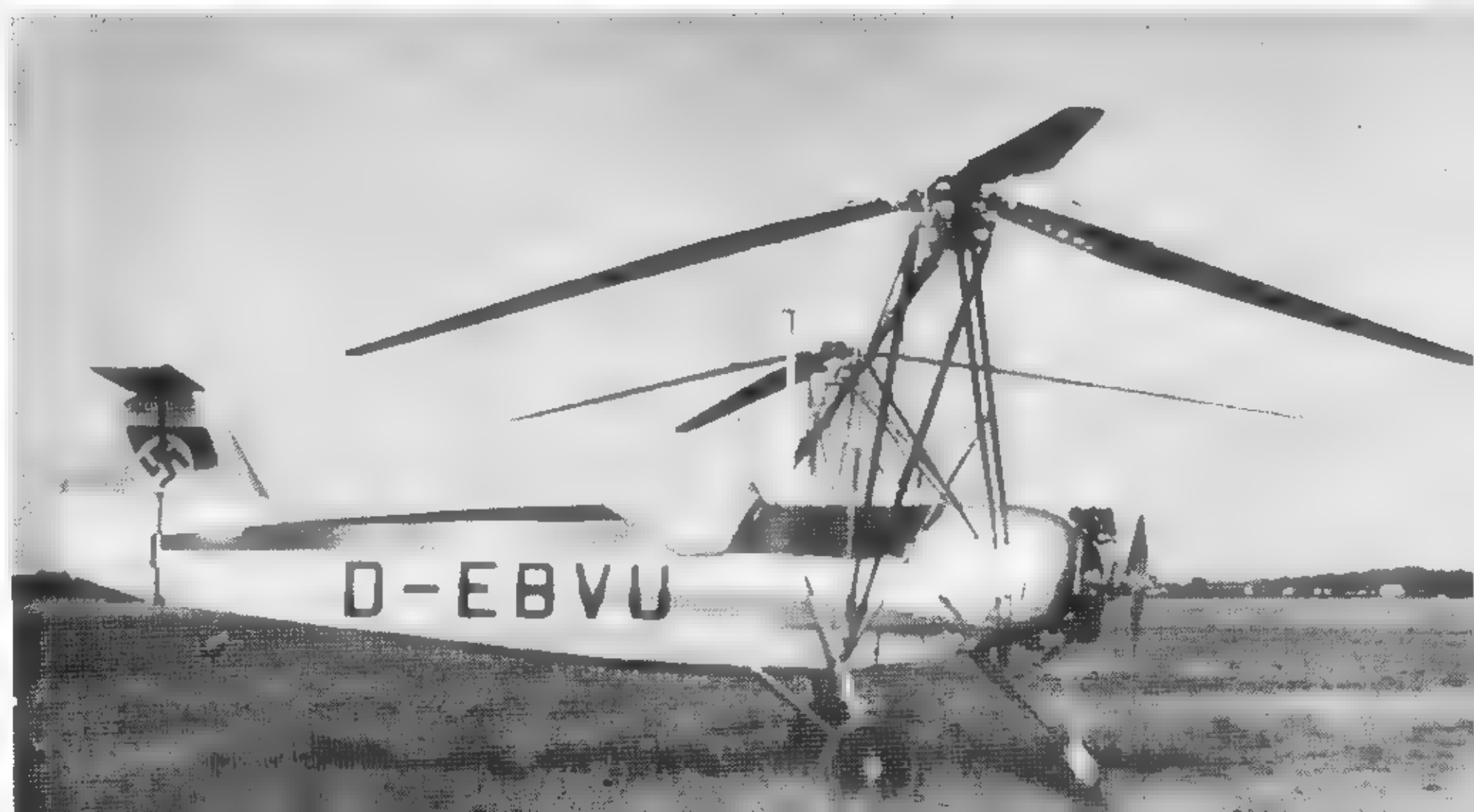
The Focke-Wulf Fw 61 V 1, D-EBVU, after its first test flight.



Above: This picture of the Fw 61 shows the design of the rotor carrier especially clearly.

Upper right:
The Fw 61 V 2 during testing.

Right:
Fw 61 V 2 differed only slightly from the first model, V 1.





Fw 61 V 1 and V 2 were the first helicopters that could really take off and land vertically. Factory pilots Rohlf, Dipl.Ing. Francke from Rechlin, and Hanna Reitsch took part in the record flights.

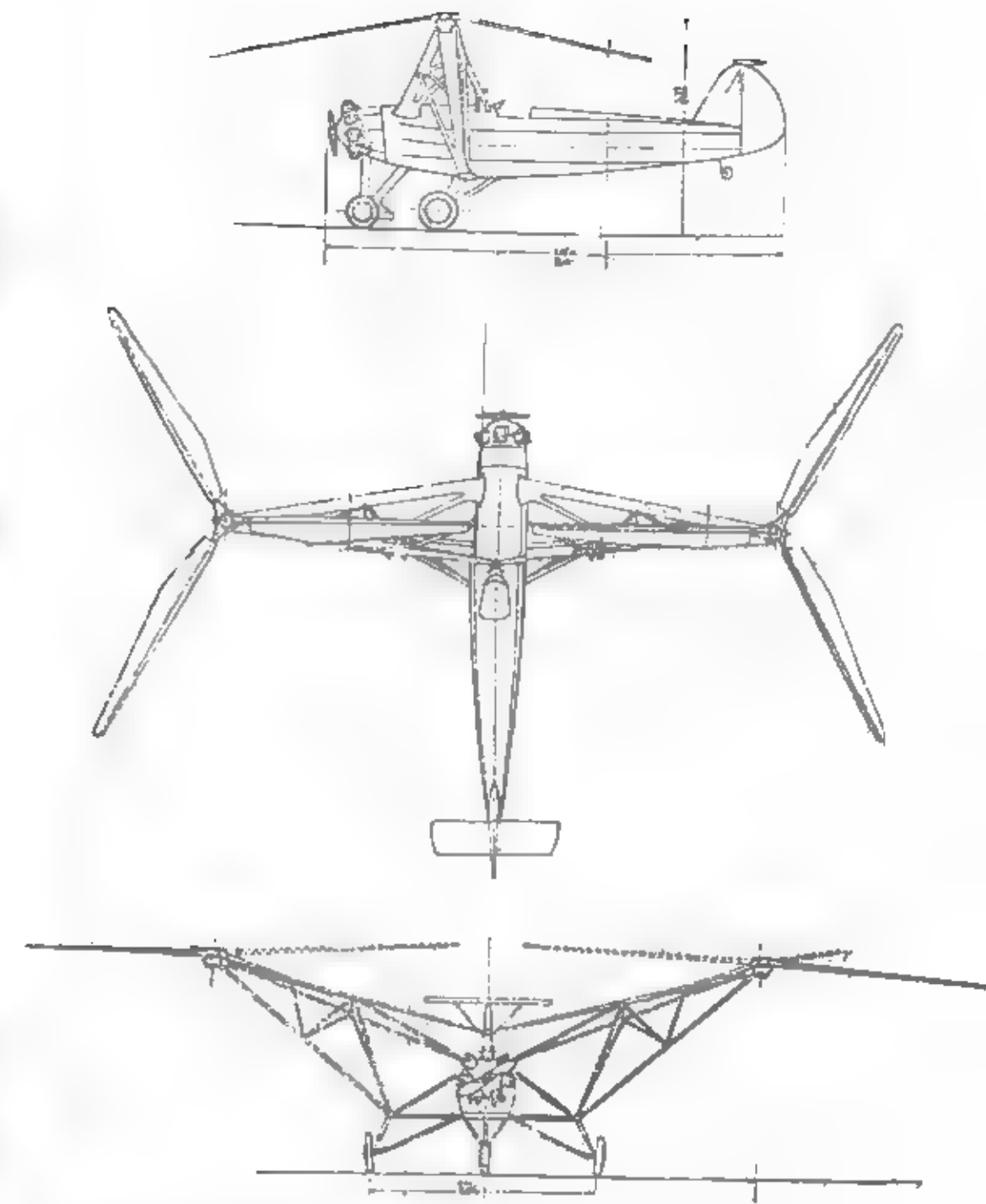


Above:
Hanna Reitsch with Chief Air Engineer
Lucht and Obersteleutant Junk and D-
EKRA at Tempelhof Airport, Berlin.

Upper right:
Francke in Fw 61 V 2.

Right:
Rohlf (with cap) and Prof. Focke, beside
him at the right, after a record flight.



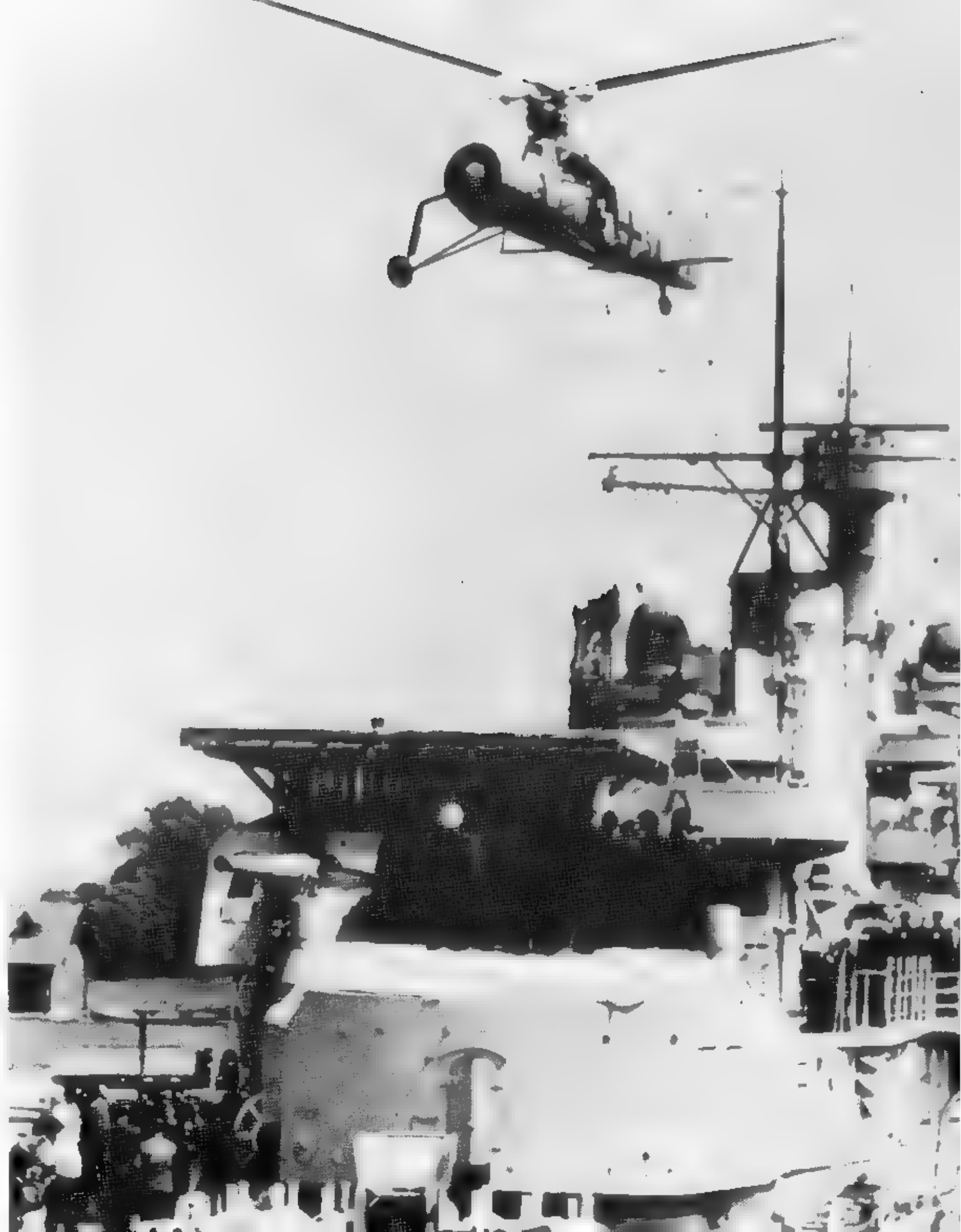


A factory drawing of the Fw 61.

Left:
Prof. Heinrich Focke with a model of the Fa 223
after the war.

The success of the Fw 61 resulted in the granting of a Luftwaffe contract for the development of a bigger helicopter that would be capable of carrying a payload of 700 kilograms. While this assignment was being worked on in Bremen and Delmenhorst, development had reached a new phase for Flettner. He and his colleagues Hohenemser and Sissingh had worked out a completely new concept. Both recorded their experiences in helicopter development in research works that were to play an important role in helicopter development in the USA after the war. What was essentially new in the concept was the use of two opposed rotors meshing with each other. The solutions to all helicopter design problems found by Flettner and his colleagues led to the development of the Fl 265 V 1 helicopter, TK+AN. In purely external terms, it did not differ from its Fl 185 predecessor. The same powerplant was also used. The important factor was the use of a rather large empennage. Five Fl 265 helicopters were built and saw service in 1939-40 aboard naval cruisers in the Baltic Sea. Until one fatal accident occurred, there had been no serious incidents with the Fl 265. How well the machine reacted was shown in a test in which two Bf 109 planes tried to attack the helicopter. They were not able to hit it! In spite of this, only a small series was built, since Flettner already had an improved type, the Fl 282, under construction.

Right: Flettner Fl 265 over the landing platform on the turret of a light cruiser.





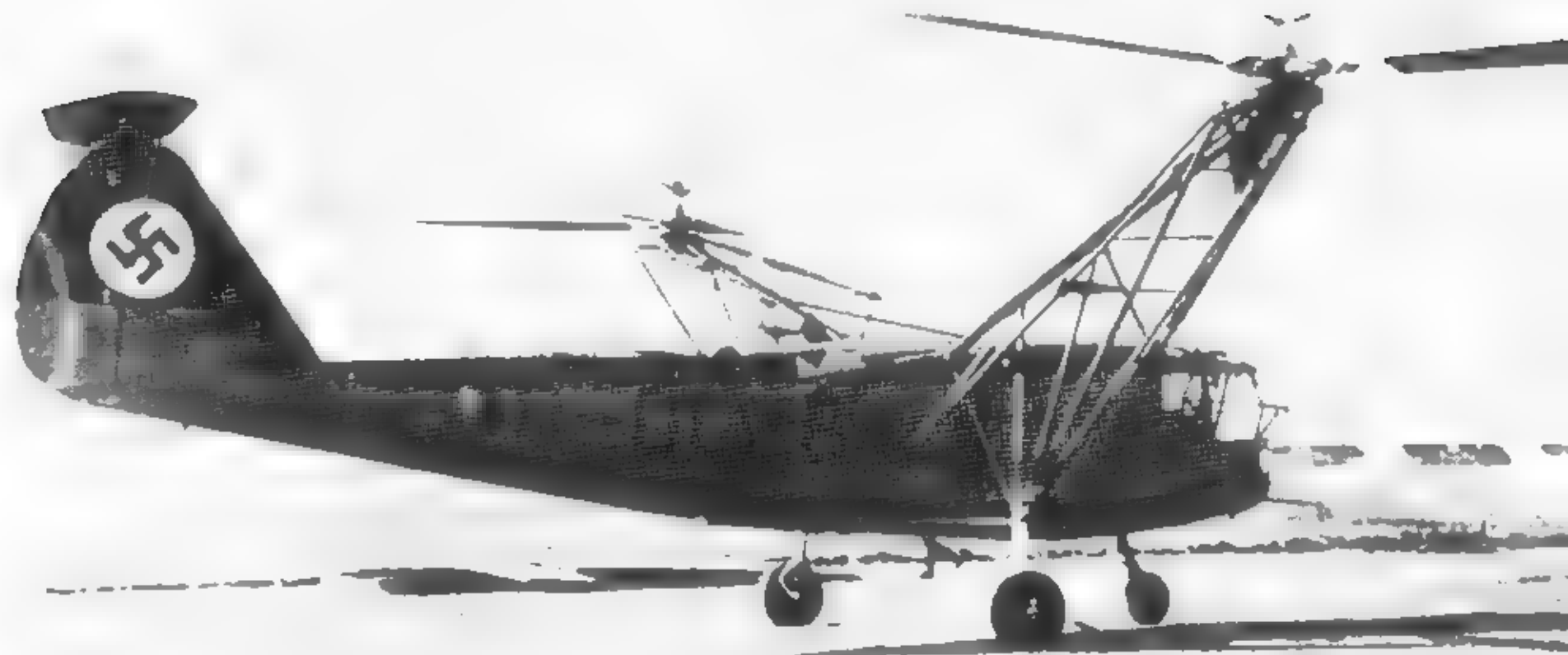
Flettner Fl 265 V
1, TK+AN,
during wind-
tunnel testing.



Flettner Fl 265 V
1 during testing
at Rangsdorf.

Fa 223

Meanwhile, work continued in Delmenhorst on the contracted-for large helicopter to Focke's principles, which received the type number Fa 223. Fa stood for Focke-Achgelis. Professor Focke had withdrawn from the Focke-Wulf firm in order to be able to devote himself completely to his research work, and had founded the new company in Delmenhorst with the renowned pilot Gerd Achgelis. In August of 1939 the Fa 223 V 1 left the assembly line. But the first test runs already showed problems. Thus it took almost another year before the first flight could take place. Thus series production began only in 1942. But then the Fa 223 showed performance that had been achieved by no competing constructor: a maximum altitude of 7500 meters, a payload of up to 2000 kilograms, a cruising speed of almost 200 kph. The machine was subjected to the most stringent tests: lifting and moving a 7.5-cm antitank gun, supplying a mountain battery with ammunition and supplies, a job that normally required 40 to 50 mules. A whole battery of 7.5-cm mountain infantry guns were moved from a valley to a 2000-meter-high mountain position by a single Fa 223. In 1944 two Fa 223's were stationed in Münster as recovery and rescue aircraft, which could move not only crews but even whole airplanes. In one case, the motor of an Fw 190, weighing 1284 kilograms, was moved on a line for a distance of 32 kilometers. A former Fa 223 pilot came to the USA in 1952. He amazed the Americans, who still regarded helicopter line transportation as impossible at that time, with the fact that it had already been done in Germany in 1944.



Above: Focke-Achgelis Fa 223 V 1, D-OCEB; below: Fa 223 V 2, D-OCEW.

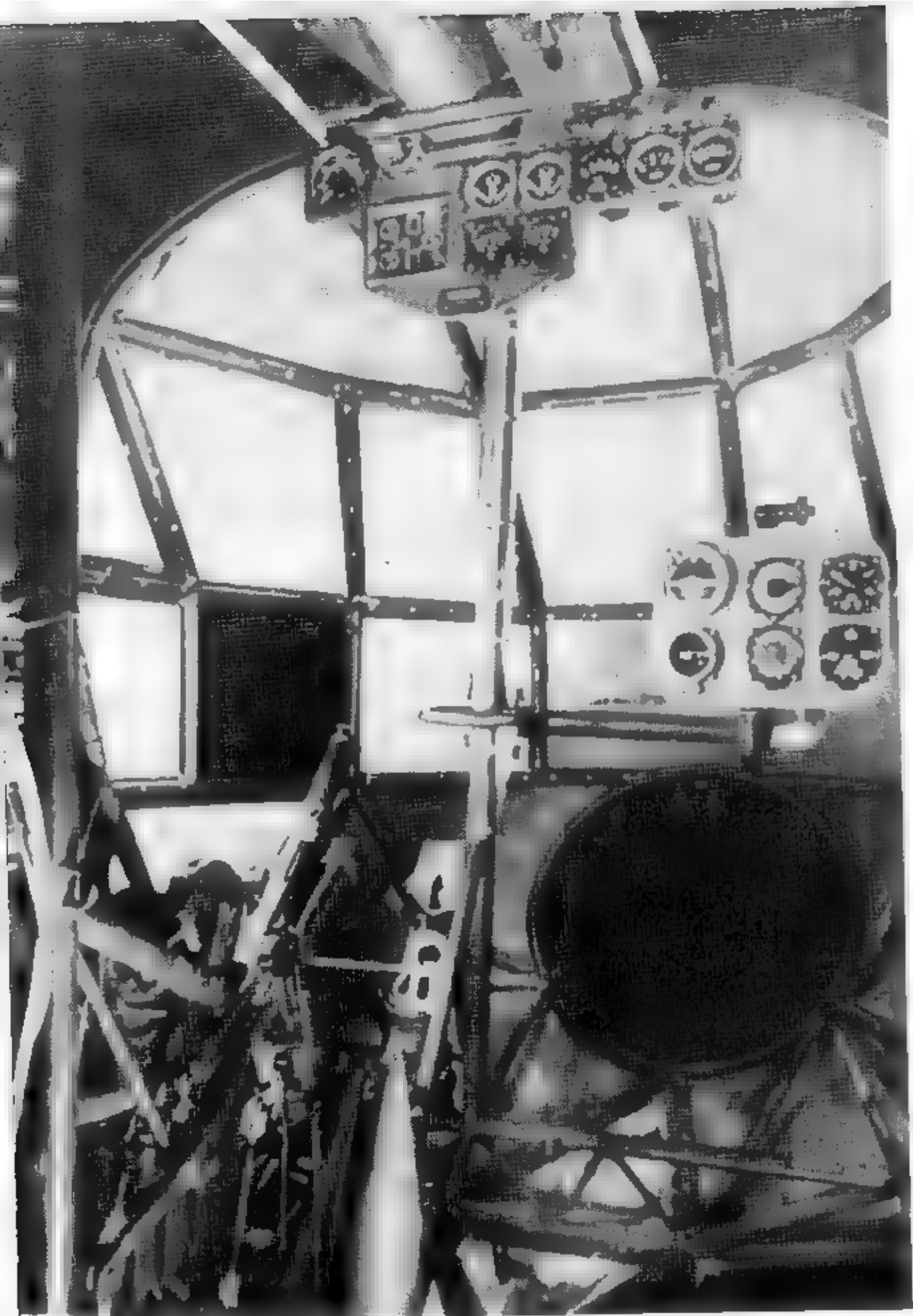




Focke-Achgelis Fa 223 F-0 during troop testing.

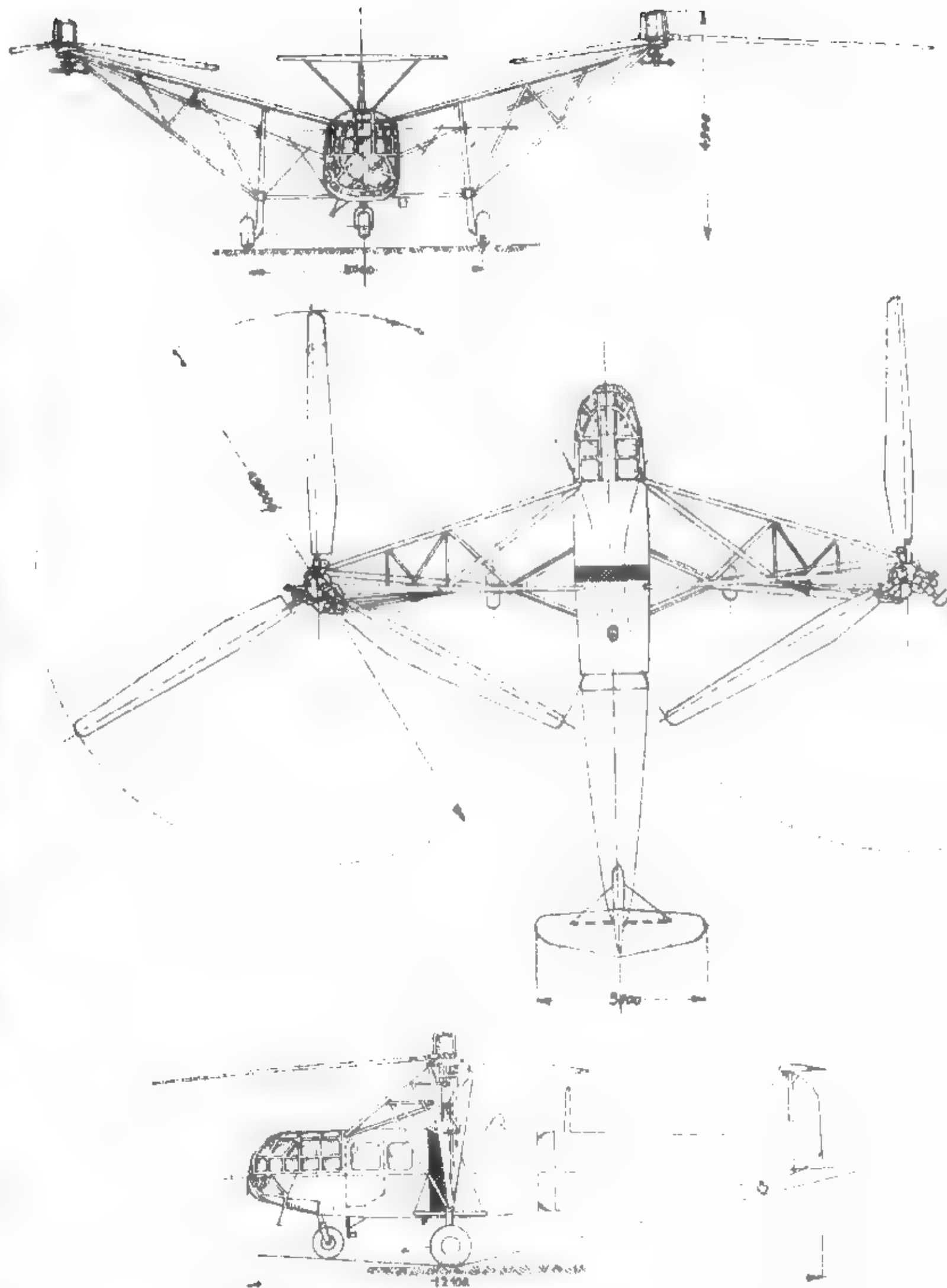


Front view of the Fa 223, showing the good sight conditions from the cabin.



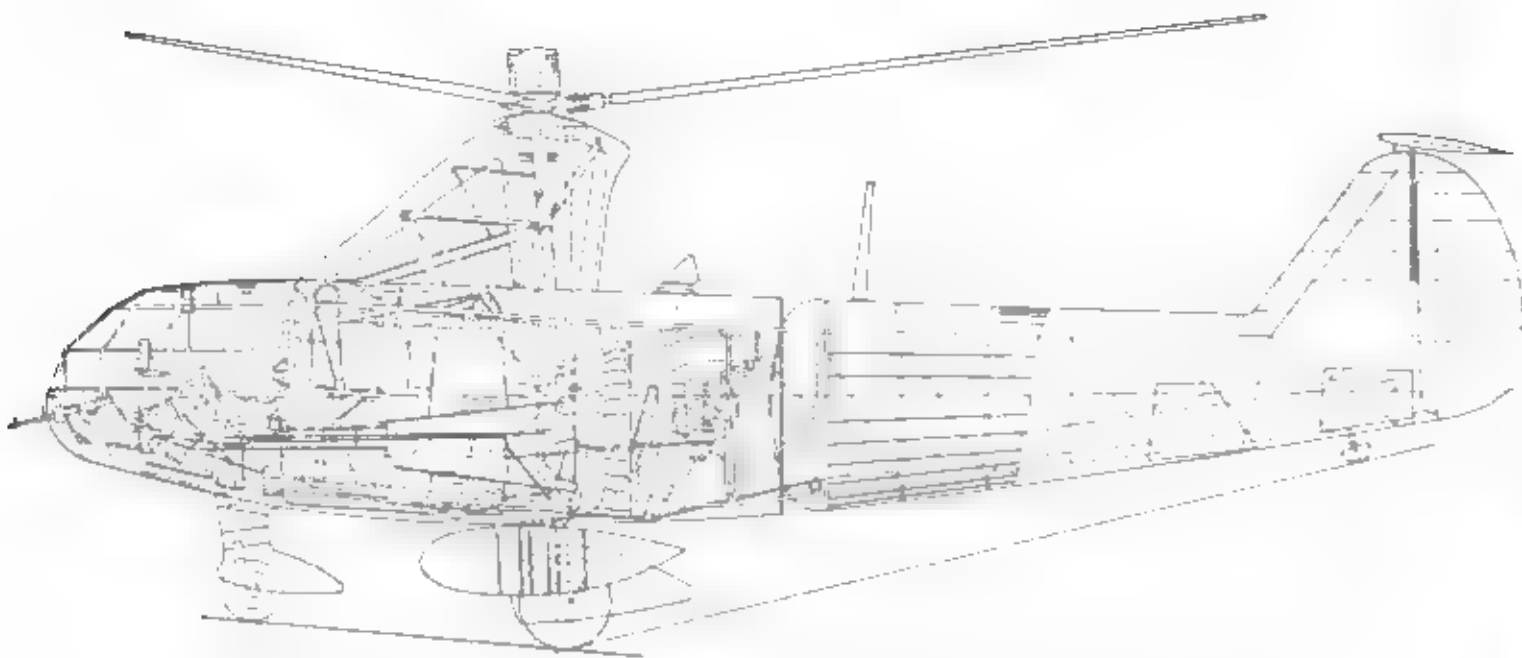
Interior view of the Fa 223 cockpit.

Right: Factory drawings of the Focke-Achgelis Fa 223.

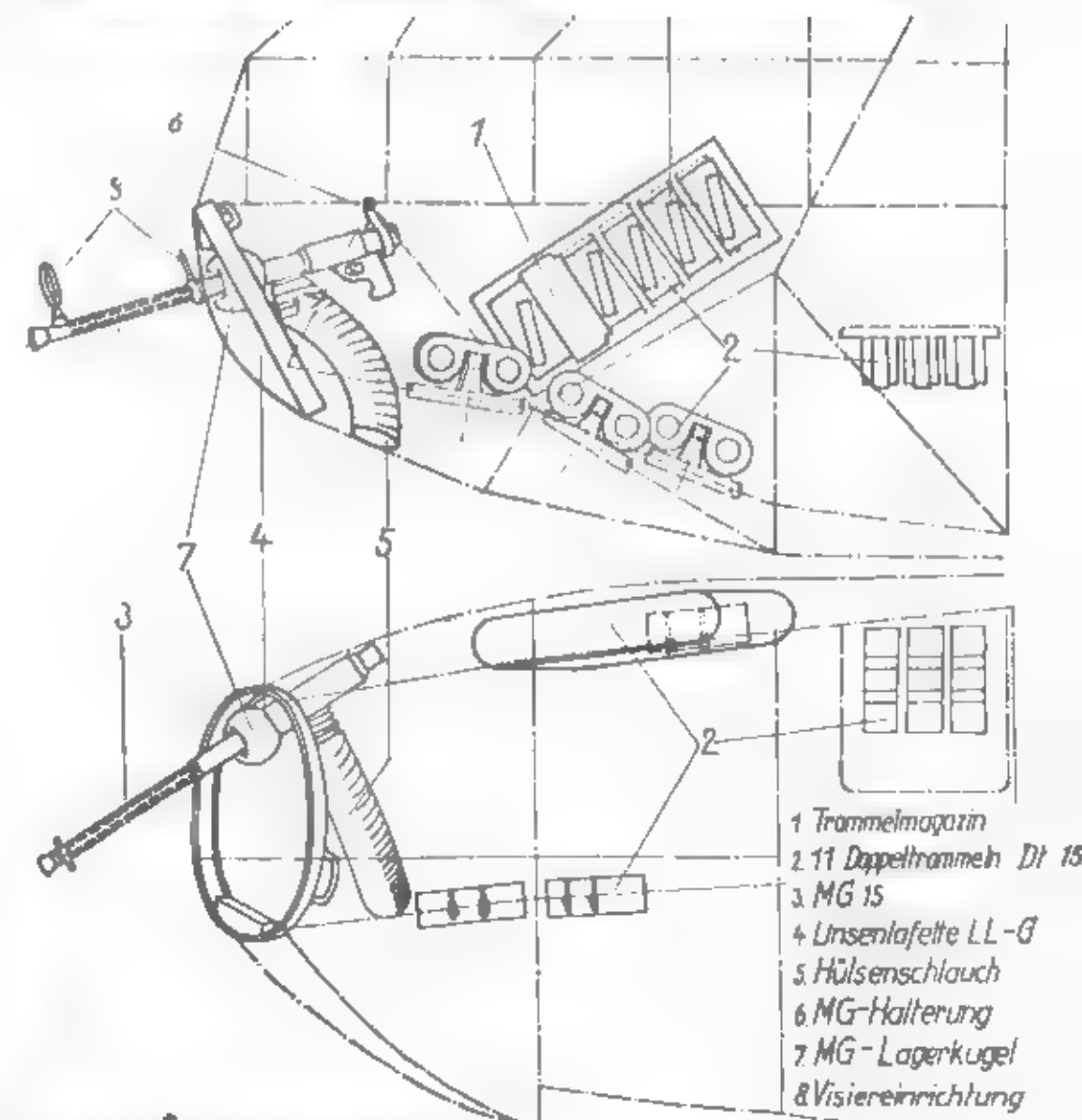
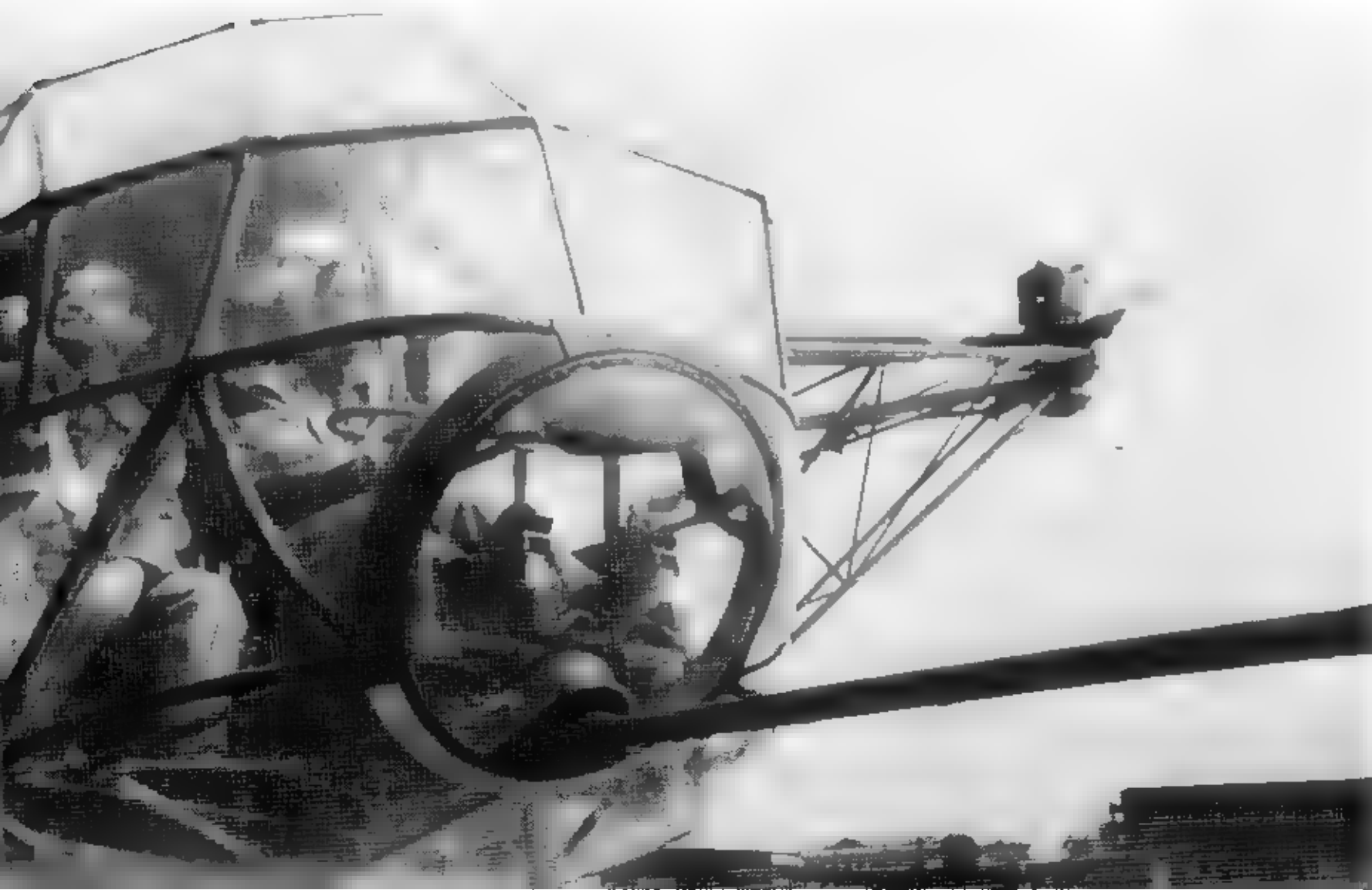




Focke-Achgelis Fa 223 during mountain testing in the Karwendel Mountains, September 1944.



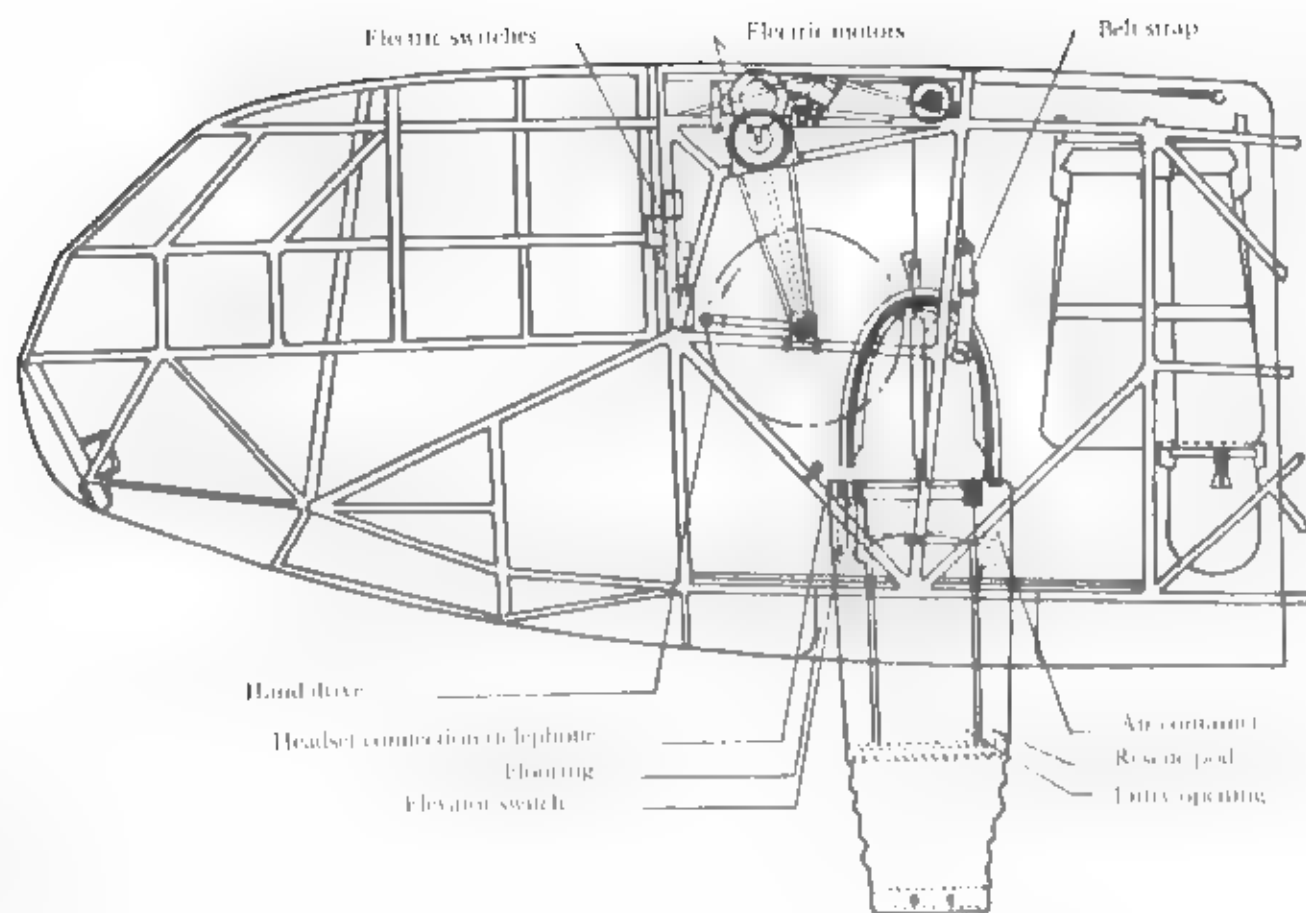
Upper left: A line drawing of the Fa 223, beside it an Fa 223 over the Karwendel Mountains at the Dresden Hut; lower left: The canopy of the Fa 223.



Bow armament of the Fa 223.

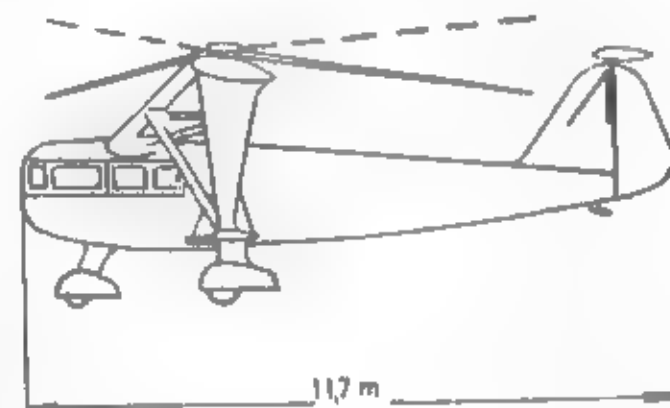
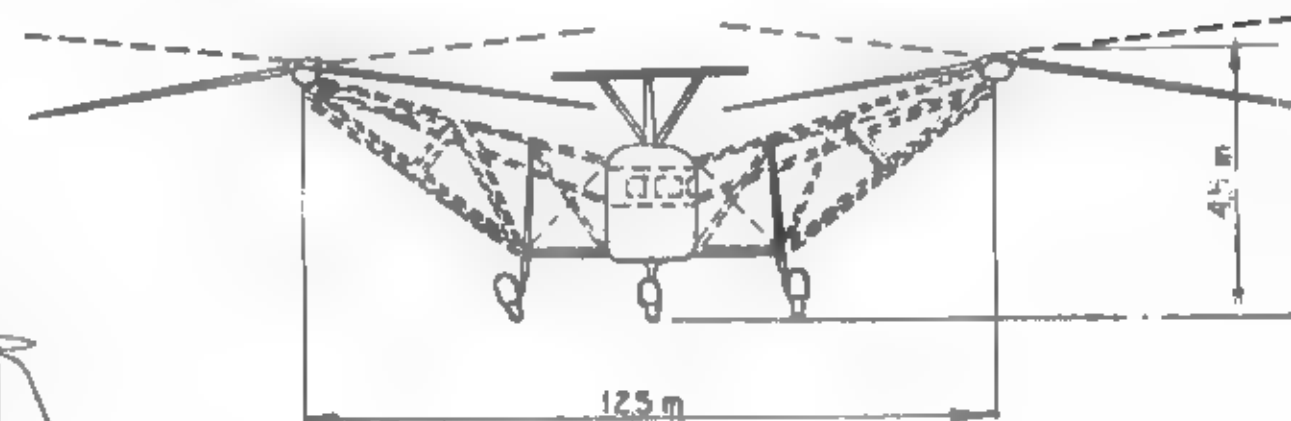


These two front views show very clearly the Focke helicopter design principle.

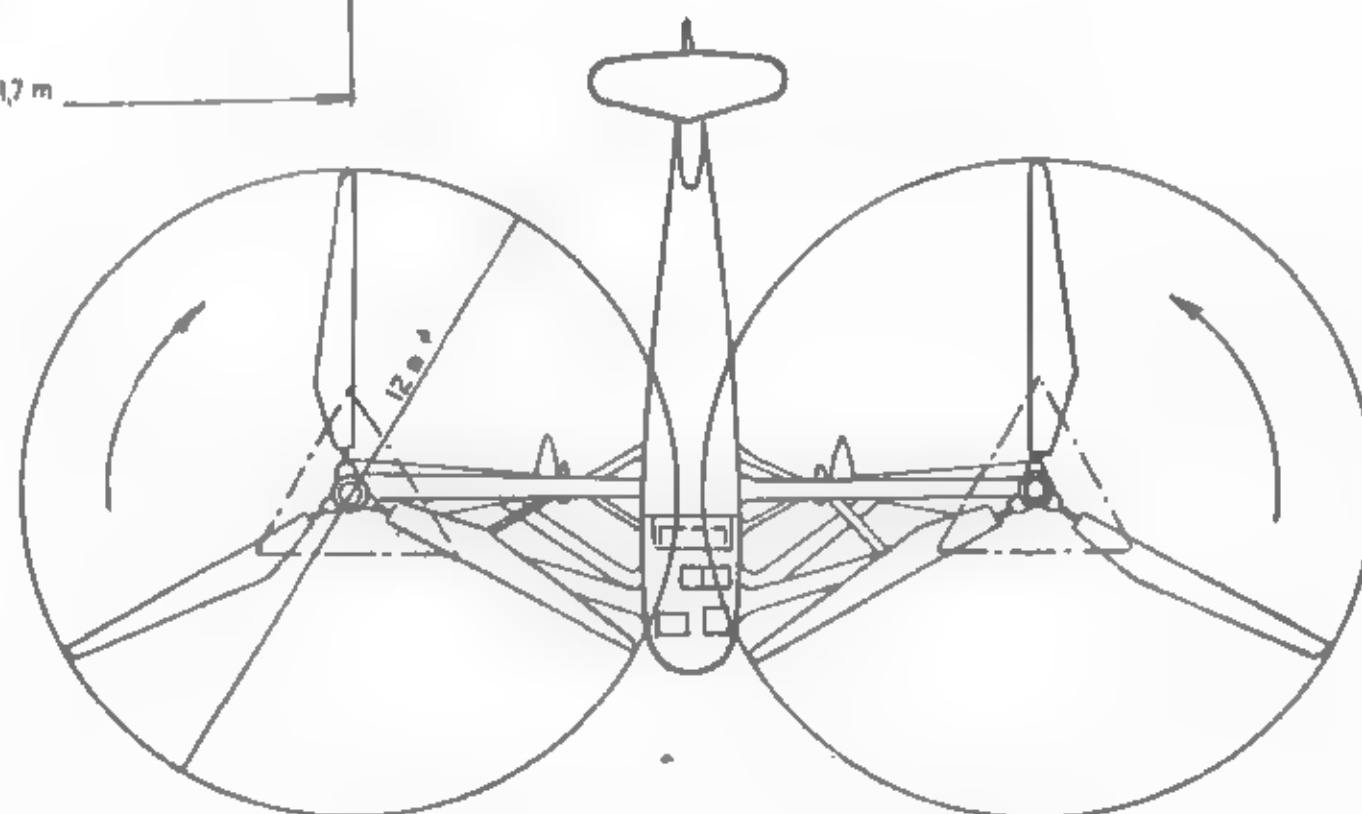


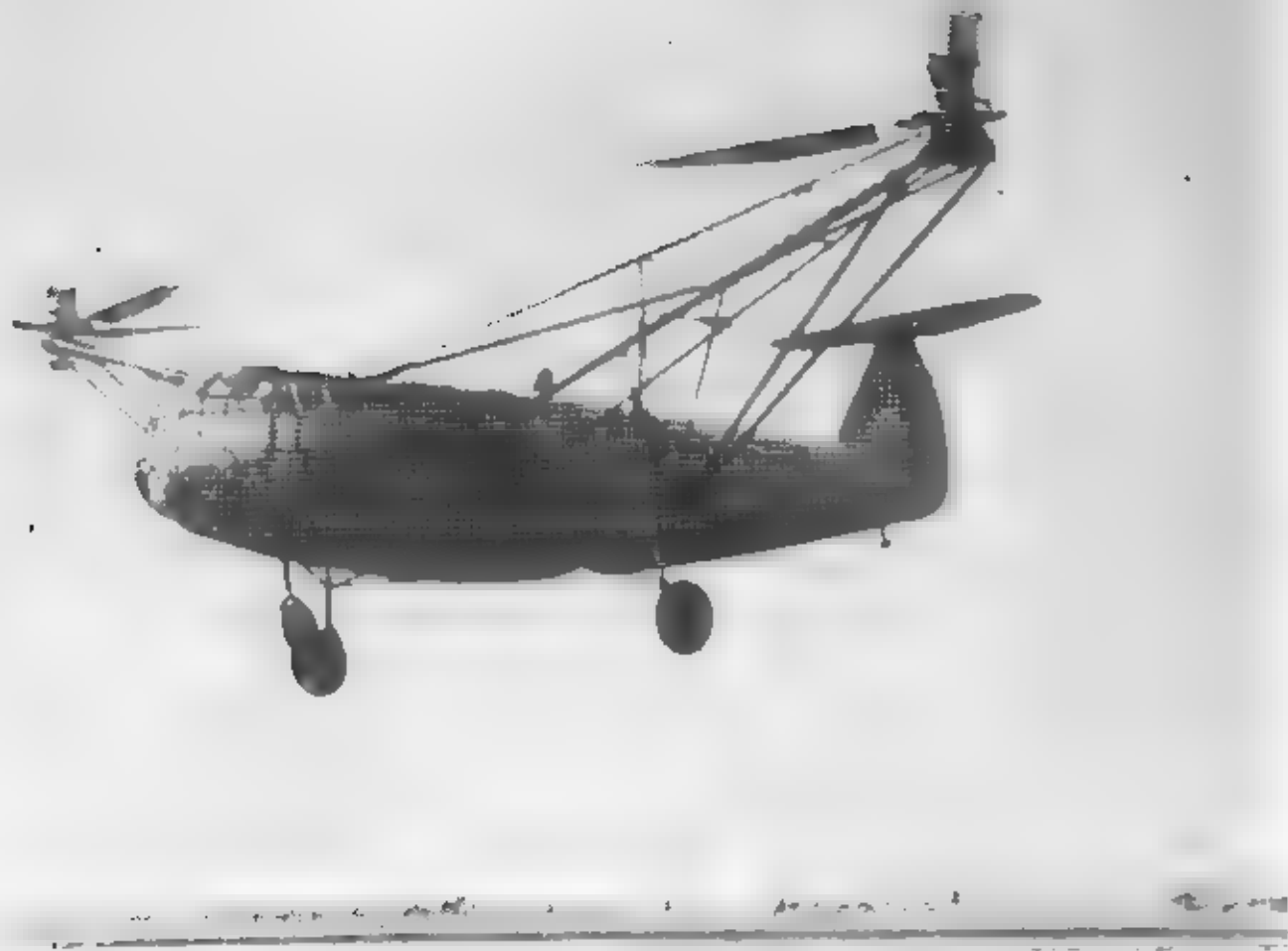
Left:
Line drawing of the Fa 223 fuselage
with lifting winch installed.

Below:
The Fa 225 passenger helicopter,
civilian version of the Fa 223,
remained only a project because of
the war.

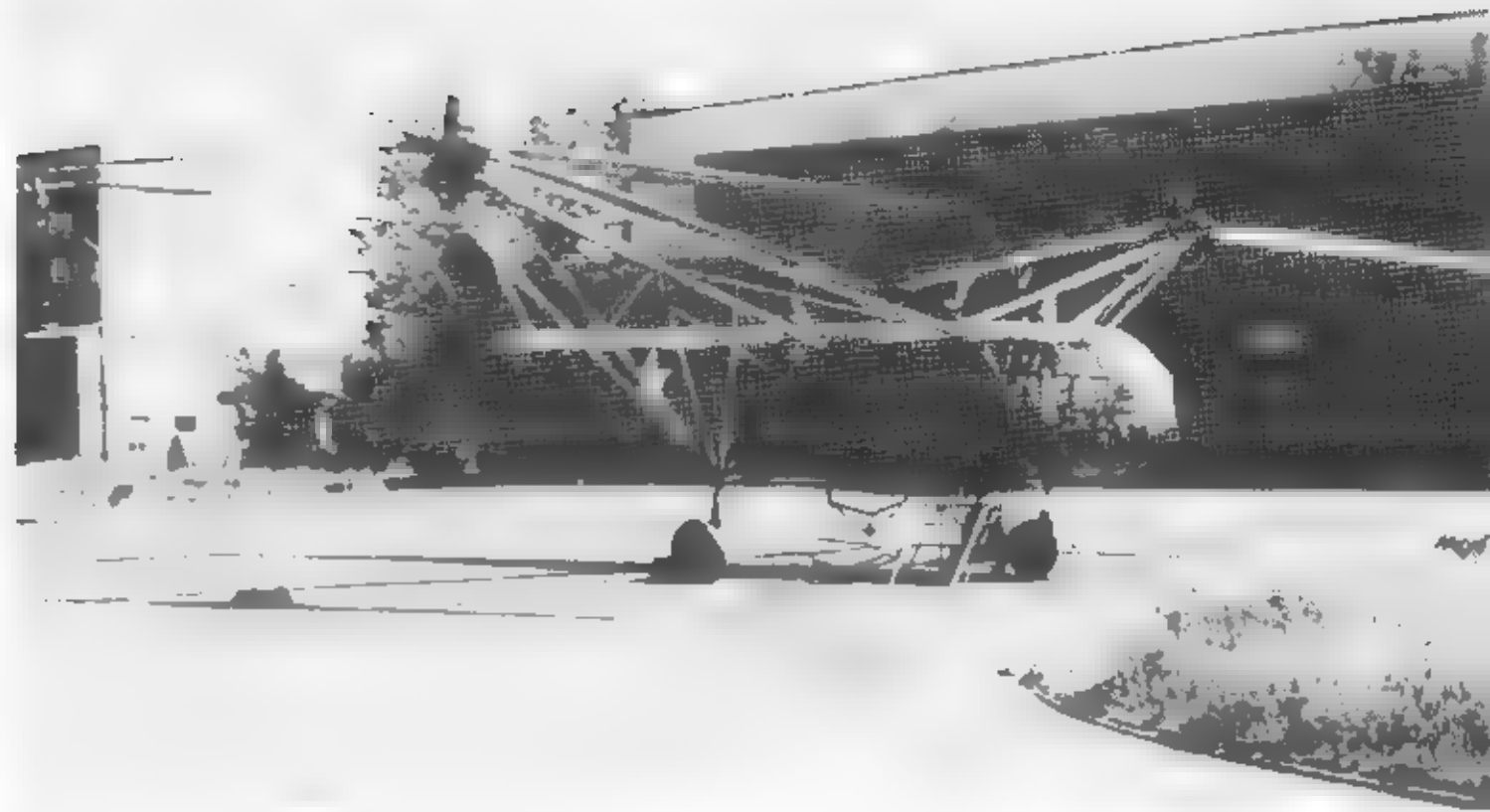


In the summer of 1942 the Fa factory at Heyenkamp was hit so hard by a British bomber attack that only two Fa 223's escaped destruction. By 1944 only eight Fa 223's could be built there, plus one more in Berlin. By the end of the war, only three Fa 223's existed. One of them was flown to England for the Royal Air Force by a German crew in September of 1945. This was the first time the English Channel had been crossed by a helicopter. On its first test flight with the Royal Air Force, this machine was crashed. A planned civilian version of the Fa 233, the Fa 266, was never built.





A German Fa 233 in England.



A German Fa 233 in the USA.

An Fa 233 in Czechoslovakia after the war.



A French copy of the Fa 233, the SE 3000, used by SNCA-SE.



In July of 1940 the new Flettner helicopter, the Fl 282 "Kolibri", was ready for series production. Fifteen pre-series and thirty series machines were ordered, and were built at the main factory in Johannisthal and the new facility in Bad Tölz. Flight testing began in 1941 and was chiefly carried out by Hans F. Fulsting. It was so successful that the Fl 282 became the most frequently used German helicopter. The Fl 282 V 5 was used in takeoff and landing tests on a 4x4-meter platform on the cruiser "Köln", which proved that landing caused no problems, even in a rough sea. Taking off proved to be more difficult until suitable methods were found.

The first two Fl 282's had closed cockpits and were designated Fl 282 A-1. All the others were open and called Fl 282 B-1. By 1943 some twenty Fl 282's were finished; they saw service with great success in the mediterranean, the Aegean and the Baltic Seas, particularly as protection aircraft for convoys. The Fl 282 was also very successful in searching for enemy submarines, and could quickly summon other aircraft to attack the U-boats. Flettner's attempt to develop an Fl 339 for land action failed for lack of time. A makeshift solution was found: fitting the Fl 282 B-2 with an observer's seat behind the powerplant. All other Fl 282's were single-seaters. Despite some difficulties, the Fl 282 B-2 proved to be a useful solution, which gave especially good results in shooting-in artillery. In 1944 the establishment of an independent artillery observation unit consisting of three Fl 282 and three Fa 223 helicopters was begun. Otherwise the Fl 282 was used only individually in combat. At the end of February 1945, Fl 282's spotted the attack of the 1st and 2nd White Russian Front in Far Pomerania at the right time. Because

of the weakness of the German army units, their report could not stop the further Soviet advance. Several Fl 282's were stationed at Berlin-Rangsdorf and did a good job as artillery aircraft in the defense of Berlin. Gradually they fell victim to Russian fighters and, even more, to Soviet flak.



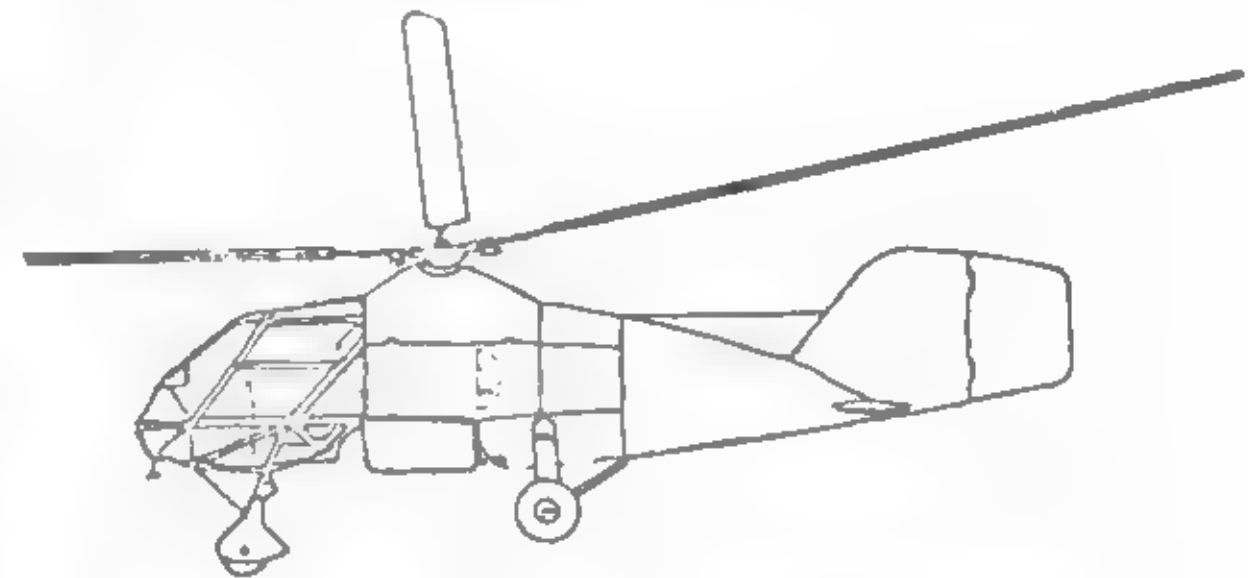
The Flettner Fl 282 V 2 was one of the first prototypes of this successful German helicopter.



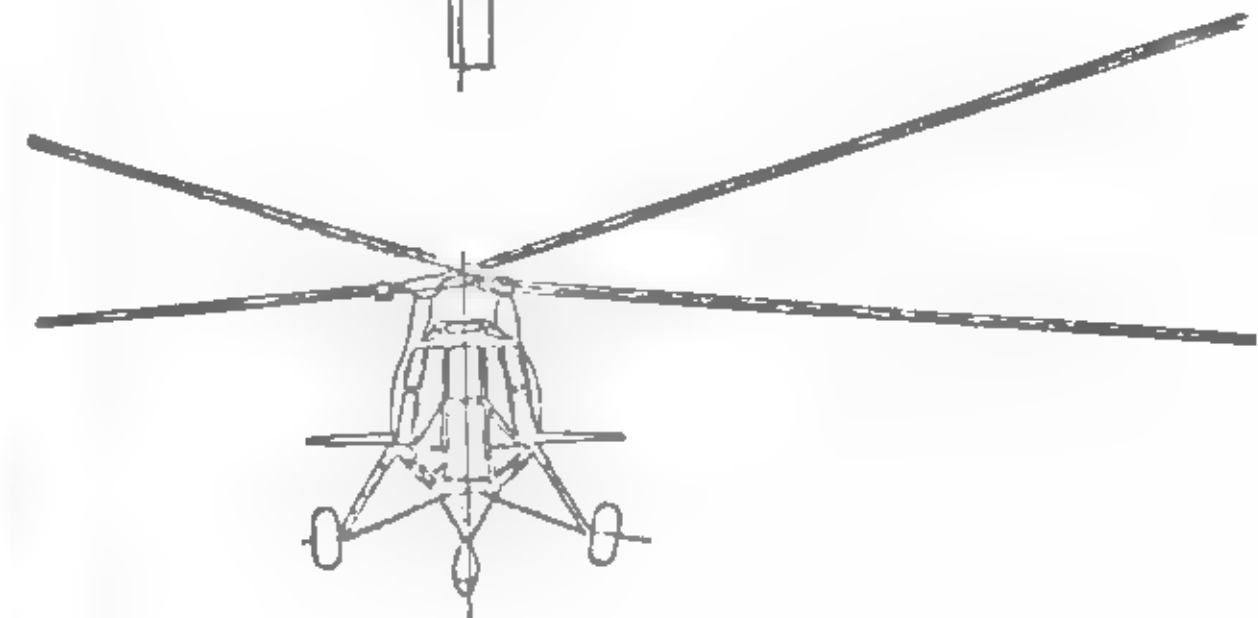
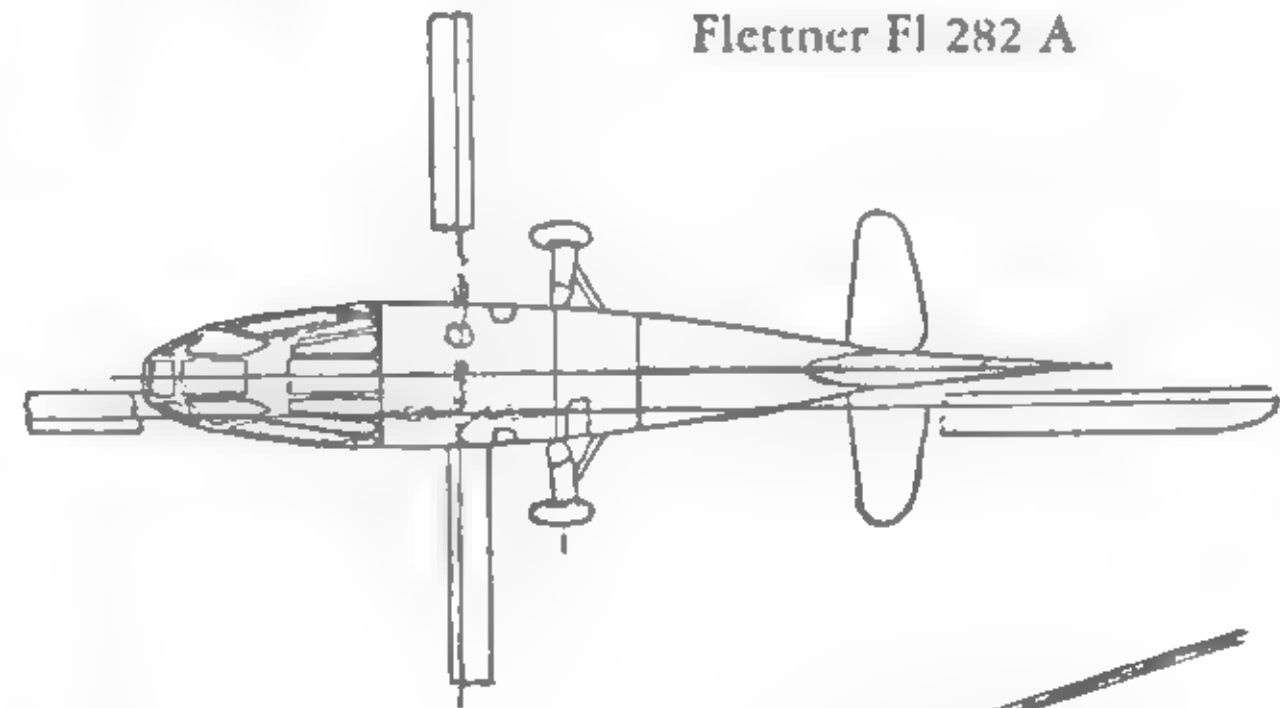
The Flettner Fl 282 V 7 was already very similar to the production version.



Left: Fl 282 V 20 with its rotor blades removed; below it:
Another test machine with additional stabilizing surfaces.
Below: Factory drawings of the Fl 282 A.



Flettner Fl 282 A





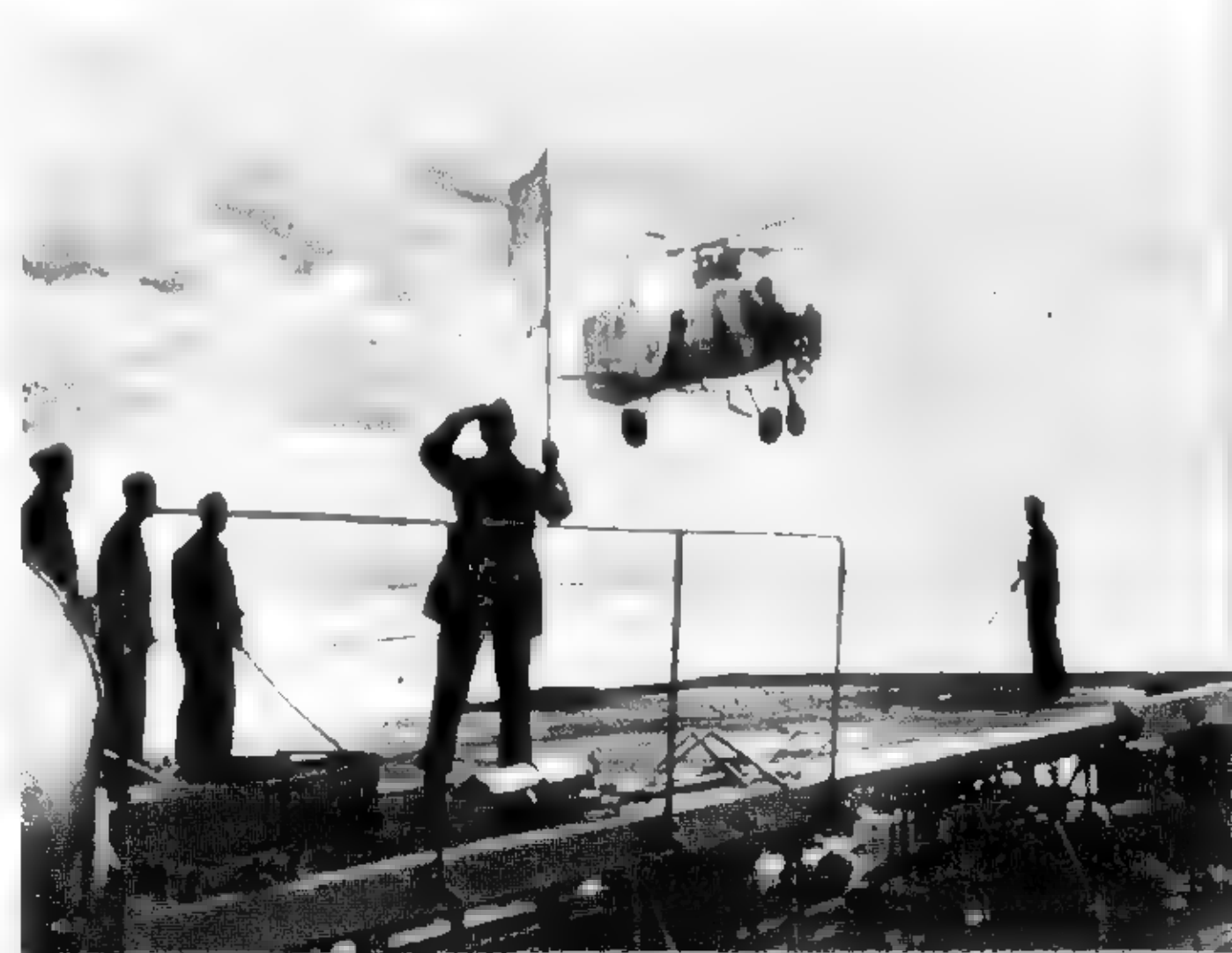
F1 282 V 21 was equipped with two observers' seats for testing.



Anton Flettner with a production Fl 282 A.



Pictures of the Fl 282 A in action in the Mediterranean.





This F1 282 A, with registration FE 4613, was subjected to intensive testing by the US Air Force and Navy.



FE 4613 (FE = Foreign Equipment) was the F1 282 V 23, factory number A-019. The rotor blades have been removed for transportation.



Upper left:
Fi 282 A-0 in flight.

Left:
Fi 282's flying from Rangsdorf to the troops.

Above:
Fi 282 during testing, with a Fieseler Fi 256 in the foreground.

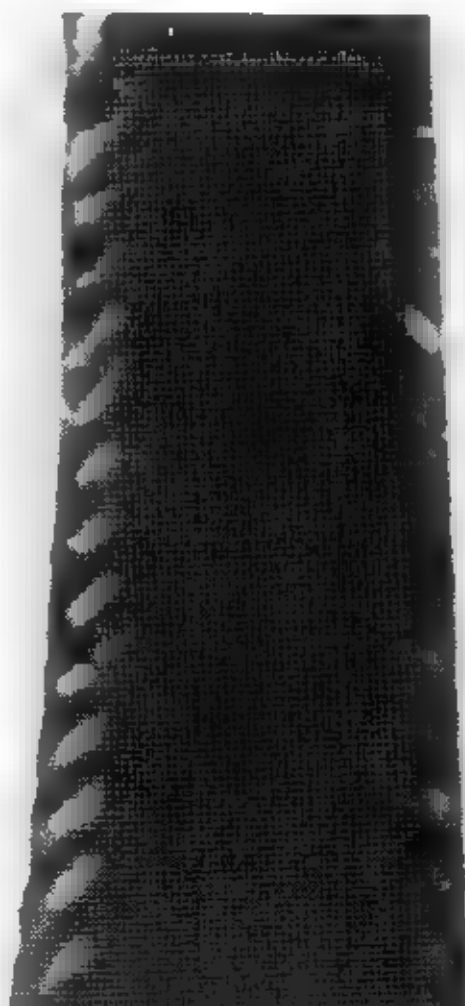
With that the development of the German helicopter would have ended. The Focke-Achgelis Fa 284 "Flying Crane" remained unfinished in 1943 on account of technical difficulties, though production of components had begun. In 1942 the Fa 225 rotor glider was developed on the basis of a request from the RLM. Here a rotor of the Fa 223 was installed without a powerplant on the fuselage of a DFS 230 freight glider. Towing tests behind a Heinkel He 45 were successful, and takeoffs and landings at a steep angle gave no trouble. This Fa 225 played a major role in the rescue of Mussolini from imprisonment on the Gran Sasso. Since the craft was regarded as a loss from the start, as a takeoff would have been impossible, its loss was of no importance. In any case, the Fa 225 fulfilled its purpose: an almost vertical landing on a very small surface.

From the development of the Fa 225 came the idea of a small helicopter that could be used as a submarine reconnaissance craft. Thus the Fa 330 "Bachstelze" was born. It was a small, very light gyroplane, designed especially for use on ships. The airstream of the ship was supposed to suffice to allow the Fa 330 to lift off. Since this device, which one can scarcely call an airplane, was very small, the rotor had only a diameter of 7.31 meters, and it could be tested in the large wind tunnel at Chalais-Meudon. Here serious difficulties were found, which could be eliminated only by bracing the rotor blades with thin wires. After that, though, everything worked so well that large-series production began. 112 Fa 330's were built and, as of early February 1943, used successfully with the Type IX D2 U-boats operating in the Far East.

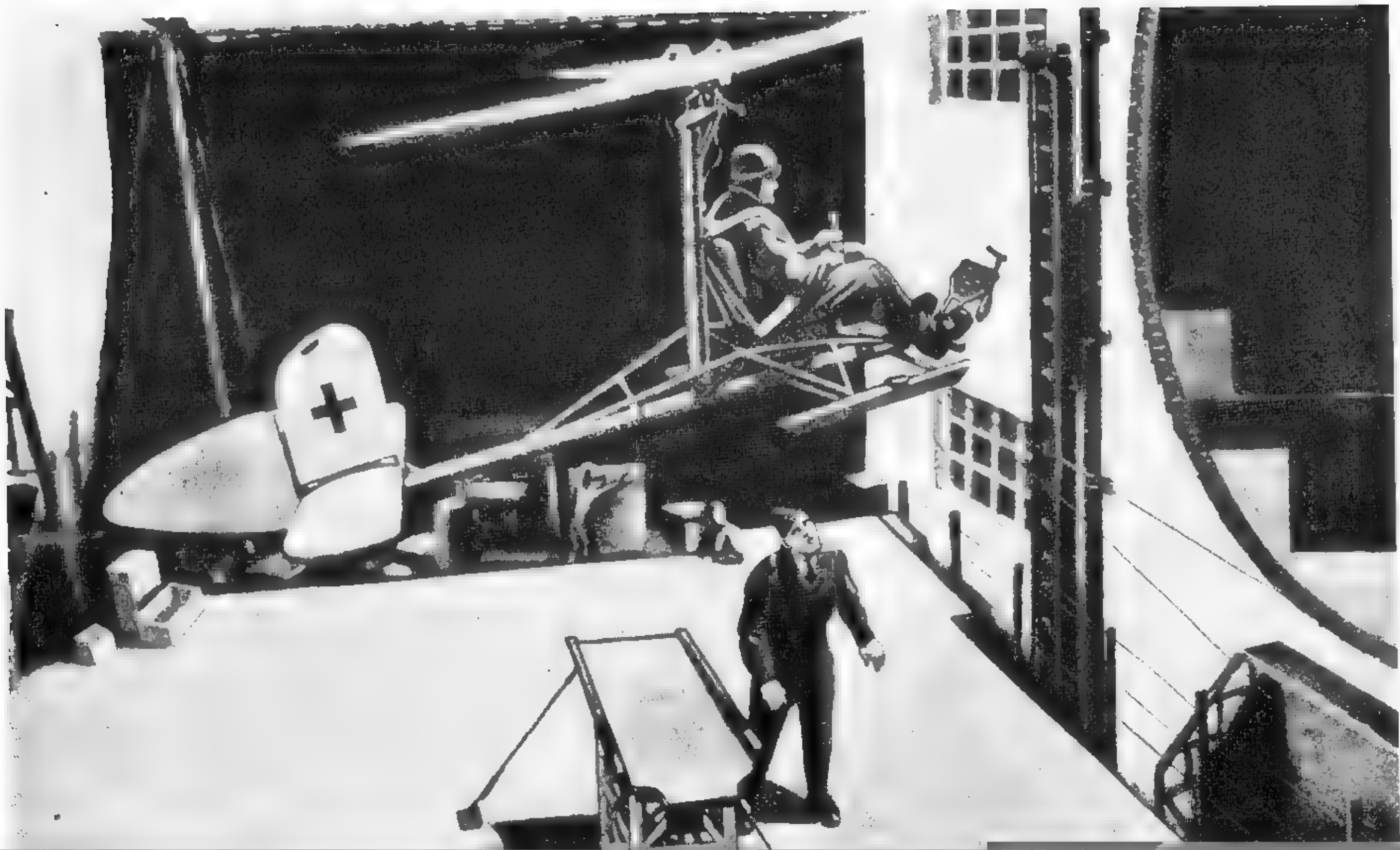


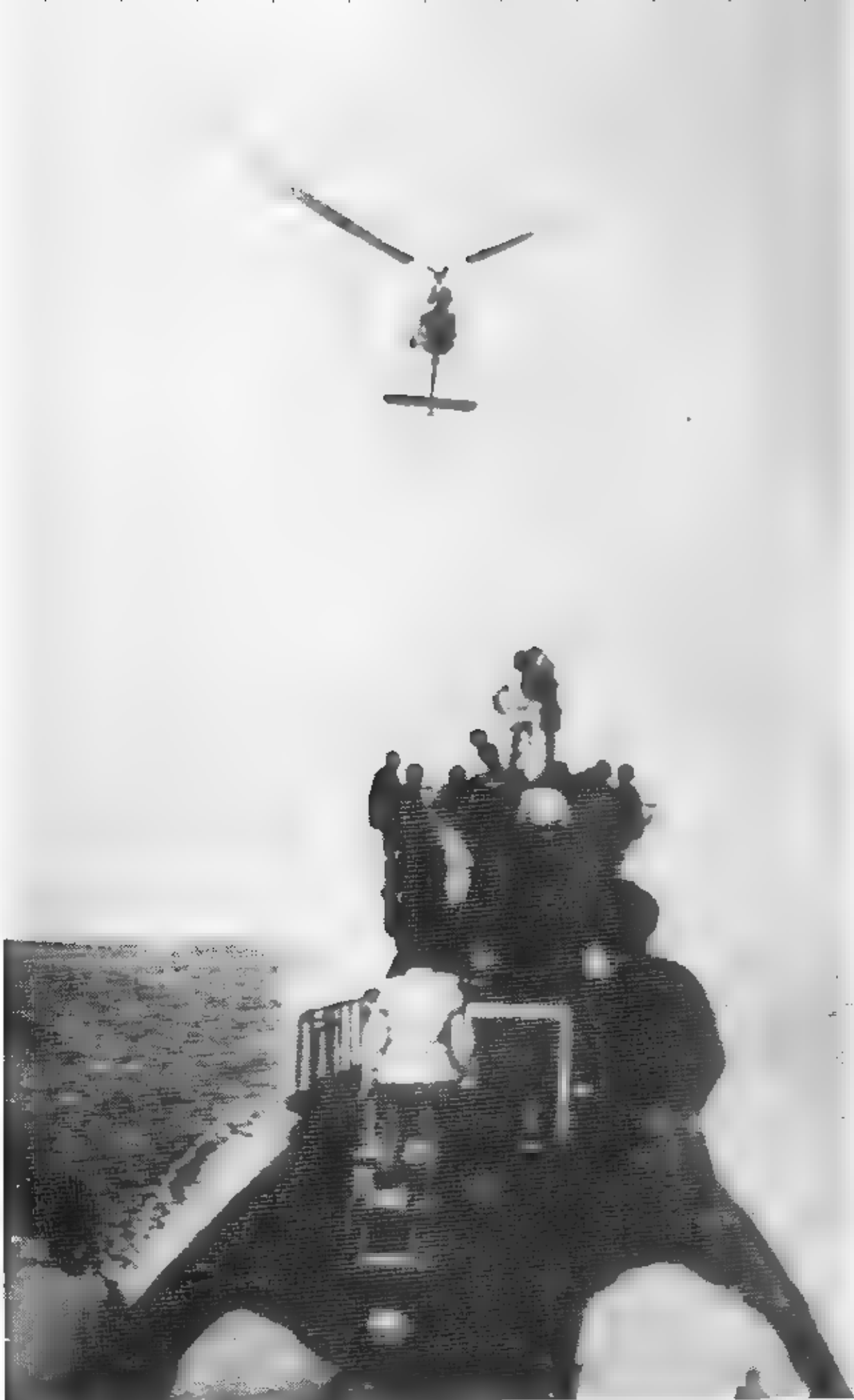
The Fa 225 towed helicopter, with the fuselage of a DFS 230 and the rotor of an Fa 223.

An Fa 225 on tow behind a Ju 52-3m.

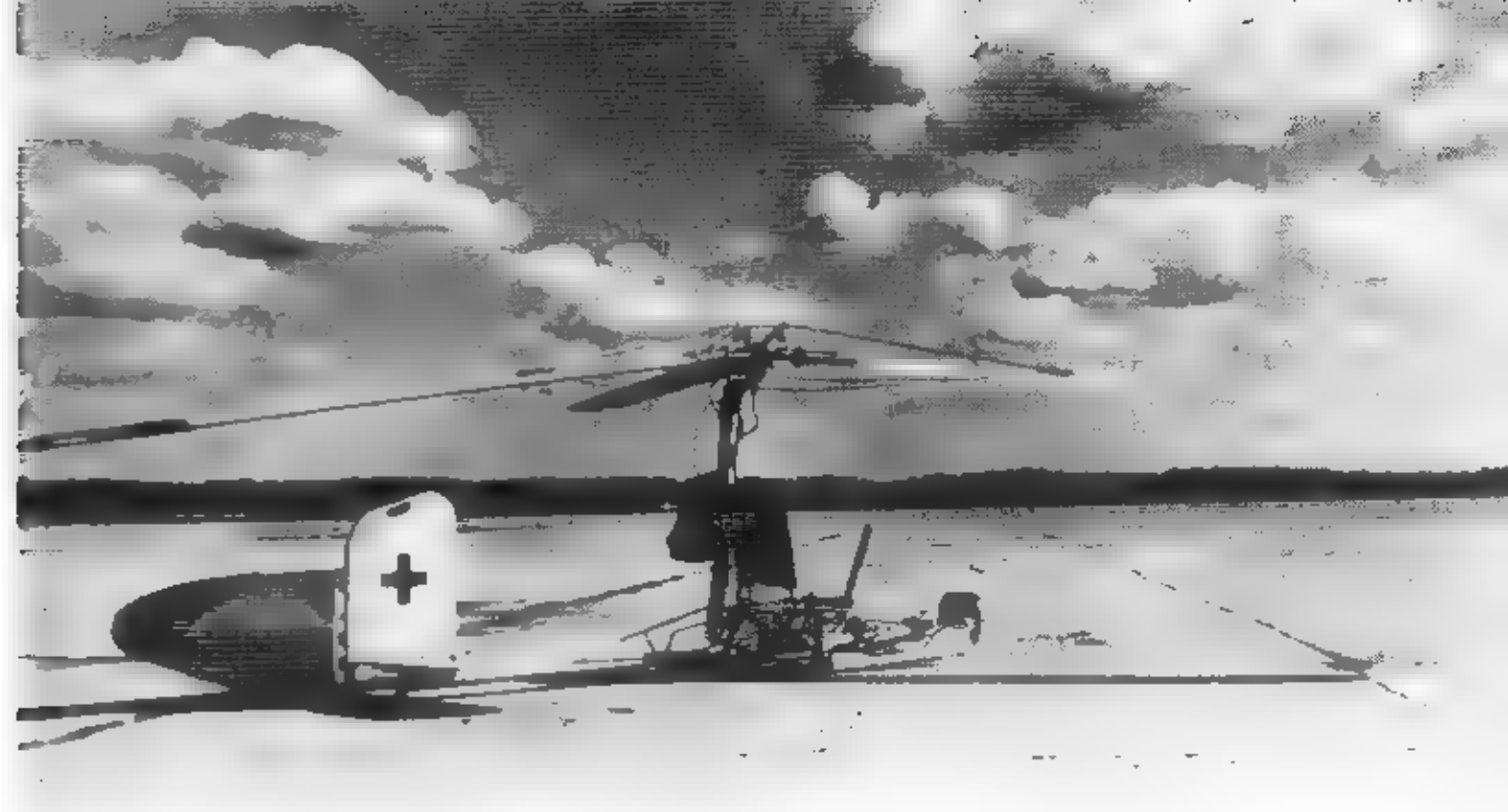


Focke-Achgelis Fa 330





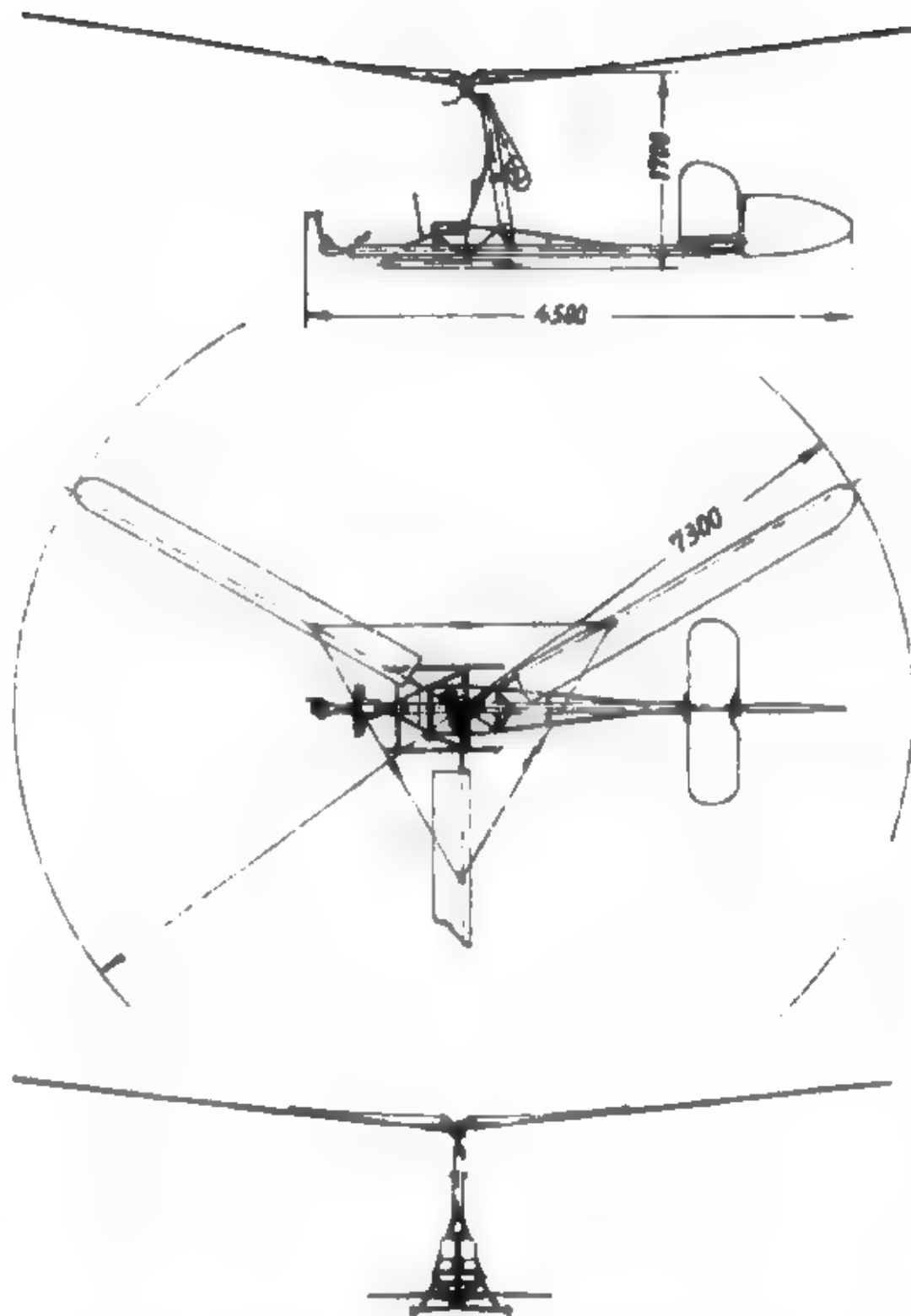
An Fa 330 in tow by a Monsun boat.



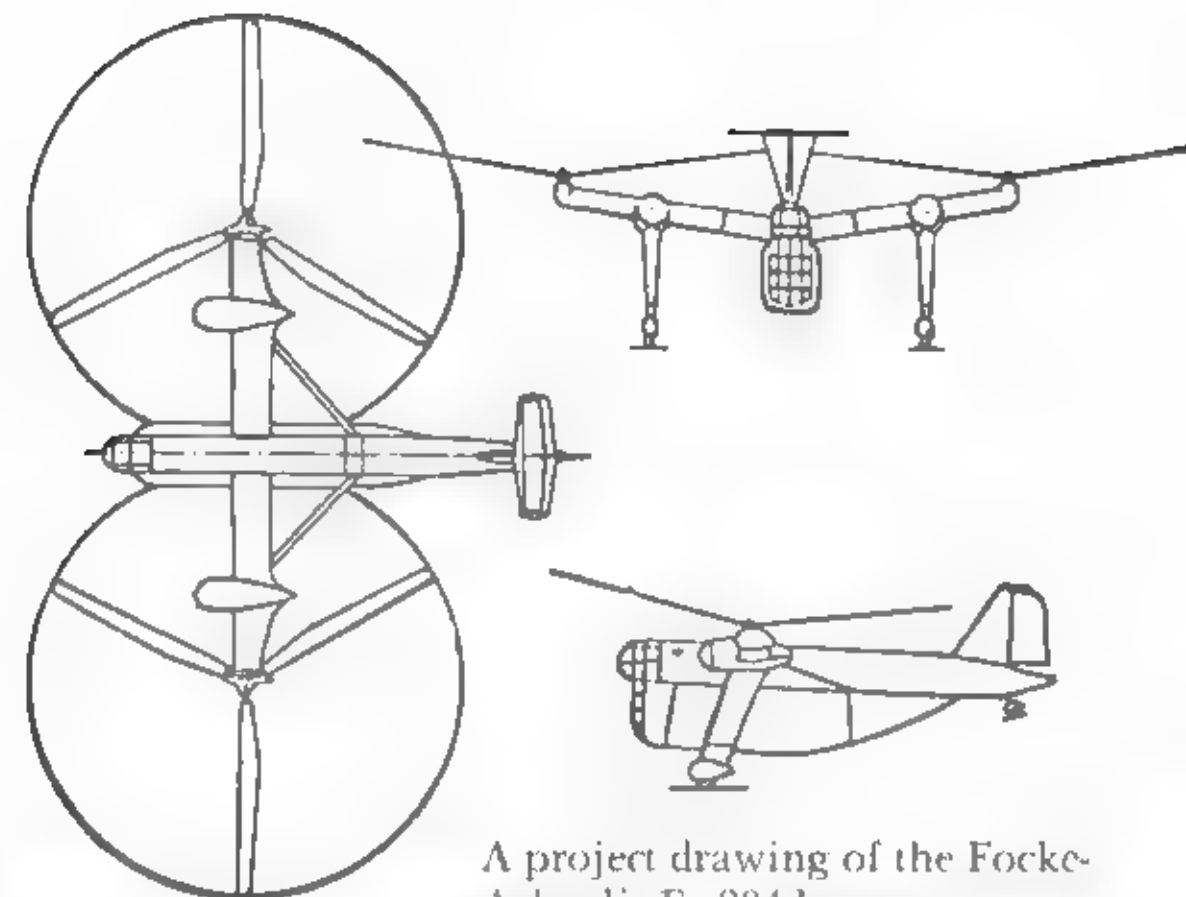
An Fa 330 during testing in the USA.



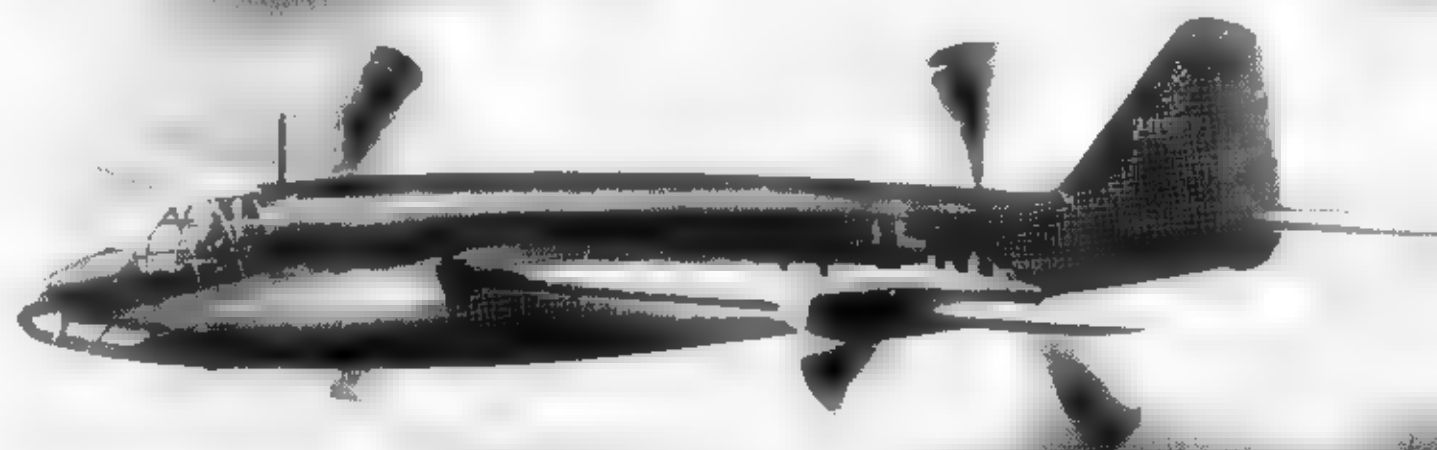
For testing on land, this Fa 330 was equipped with landing gear.



Factory drawings of the Focke-Achgelis Fa 330.



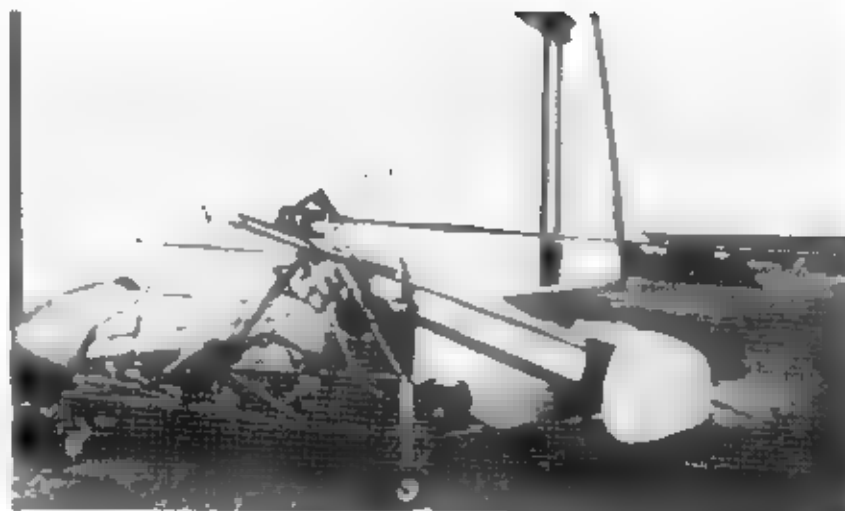
A project drawing of the Focke-Achgelis Fa 284 large-area helicopter.



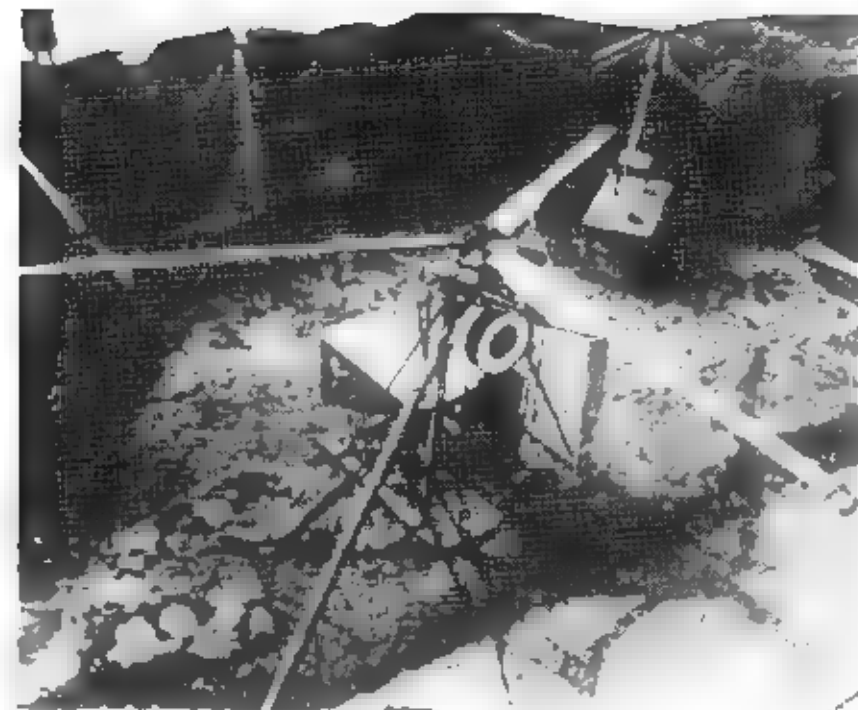
A model of the Fa 269 pursuit helicopter (project).

The first jet-powered helicopter, the Wn 342, developed by the Austrian Baron Friedrich von Doblhoff with the collaboration of Dipl.Ing. Theodor Laufer and Dipl.Ing. Stephan and built at the Wiener Neustadt Aircraft Works never saw service. The prototype, Wn 342 V 1, was begun in October of 1942. Its powerplant was a 60-horsepower Walter Micron motor. This supplied the power for an Argus supercharger. The air was inducted under the rotor, compressed, and the preheated fuel injected. The mixture was conducted over the rotor head into the hollow rotor blades and thus reached the combustion chambers at the ends of the rotor blades. The very first test was so successful that the pilot decided to risk a short hop inside the factory hall, which also succeeded. Additional test models were built at the workshop in Zell am See, but these fell into the Americans' hands during their advance into Austria and were taken to the USA.

Flettner's project of an enlarged Fl 282, the Fl 339, was not finished. Two Fl 282's were taken to the USA in 1945 and one to the USSR. A second Austrian, Bruno Nagler, did not get his one-man helicopter project going either. Since 1929 Nagler had worked on helicopter development with Raoul Hafner in England. Since British industry showed no interest in his work, Nagler returned to Germany in 1934 and obtained a development contract after the union with Austria. In 1940 the NR 55 V 1 prototype was built. Nagler had been joined by his friend Franz Rolz. The rotor system had a diameter of 10.67 meters; a 40-HP motor provided power. The entire aggregate was to weigh 340 kilograms. Beyond satisfactory results in testing the single-blade rotor, nothing else happened.



A Doblhoff test setup for a jet-propelled rotor.



Doblhoff-WNF Wn 342 V 1.

Wn 342

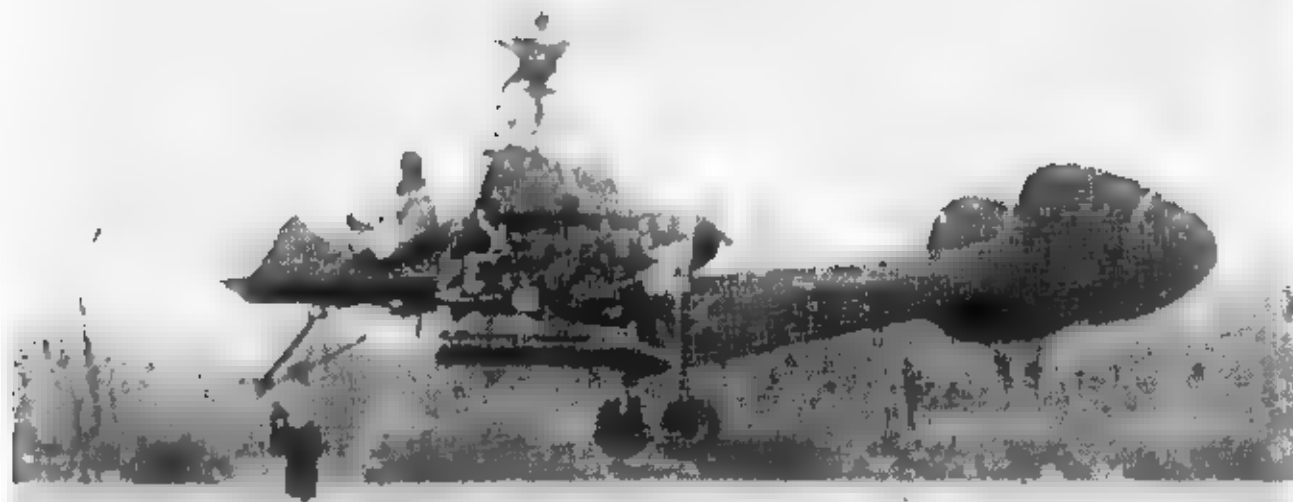


Doblhoff-WNF Wn 342 V 1 in flight.



Above and right:
Doblhoff Wn 342 V 2 loaded on a truck.

Lower right:
Wn 342 V 2 in flight.



Upper left:
Wn 342 V 2.

Above:
Wn 342 V 4, first version.

Left:
Wn 342 V 4 in the USA.

Right:
The jet on the rotor blade
of the Wn 342.

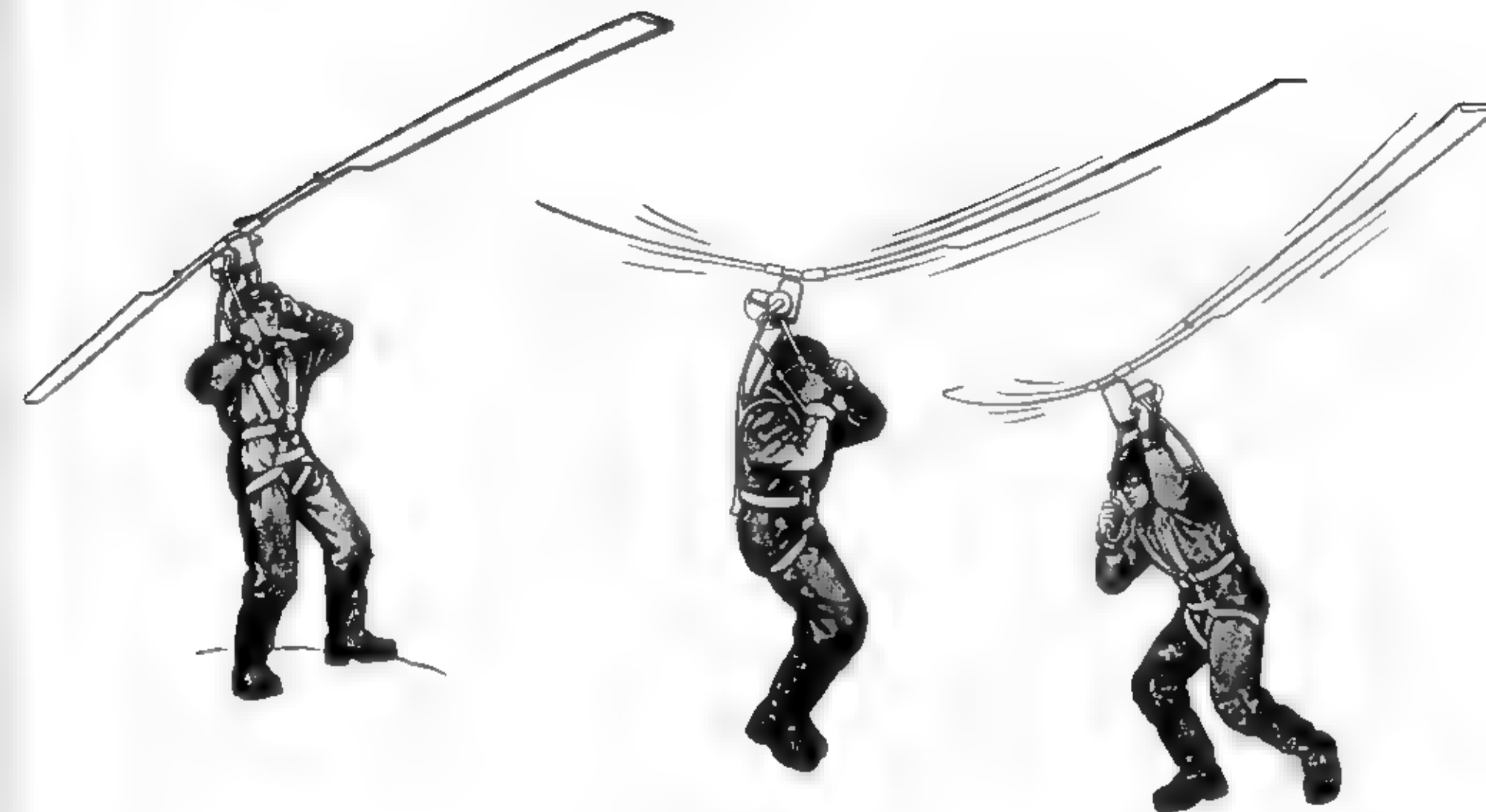


Another Austrian, named Paul Baumgärtl, worked with official encouragement but without an RLM contract on the development of a backpack helicopter. His first device, "Heliofly I", appeared in 1941. But things did not occur as they might have. Thus "Heliofly III/57", with two opposed single-blade rotors, powered by an Argus As 8 motor, was made for military use. Since the powerplant was not strong enough but a more powerful motor would have been too healthy, Baumgärtl had to give up the idea of a backpack helicopter, and built "Heliofly III/59" with a 16-HP motor. The dry weight of this one-man helicopter was only 35 kilograms, its takeoff weight about 120 kilograms. Baumgärtl had already made several flights with this device when the urgent Jäger program ended this promising development.

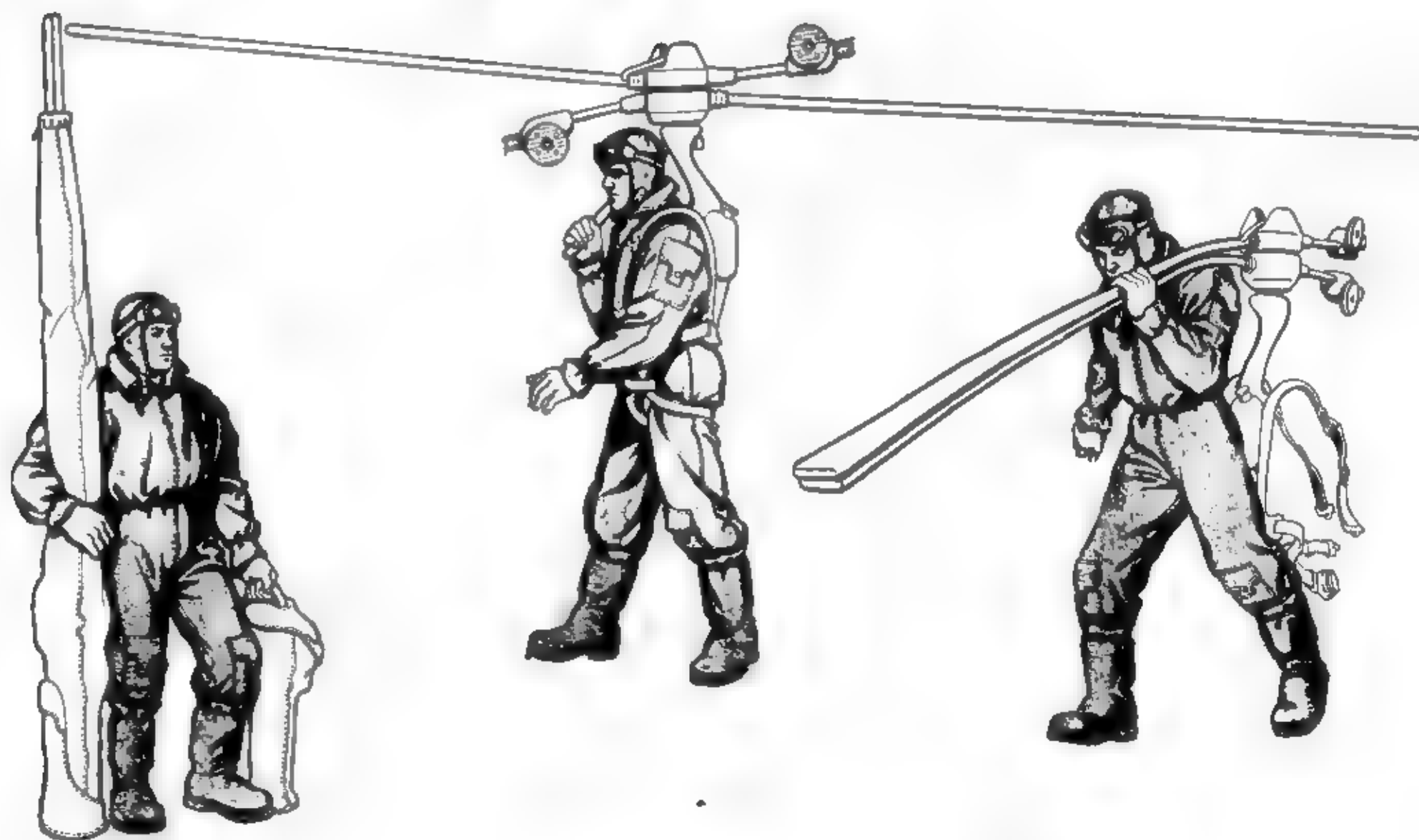
Nagler and Rolz had stopped developing the NR 55 in order to concentrate on the smaller NR 54 type. But it had shown such powerplant problems that a new NR 54 V II had to be built, which became the first wearable helicopter in the world. Two 8-HP motors gave sufficient power. Each rotor was driven by one of the motors, on which a small airscrew was mounted. The motors simultaneously provided the counterweight to the rotor blade. The rotors had a diameter of 7.92 meters. The whole device weighed 36.5 kilograms, and the takeoff weight was 140 kilograms. The following performance statistics were achieved: cruising speed 80 kph, climbing speed in forward flight 152 meters per minute, maximum altitude 457 meters, range 48 kilometers. Further projects by Professor Focke, such as the Fa 269 pursuit helicopter and the Fa 283 multipurpose helicopter with rear blower, remained in the drawing-board stage.



Baumgärtl with his "Heliofly I" backpack helicopter.



"Heliofly I" was to be handled thus in flight.



"Heliofly III '57" shown packed, mounted and folded up after a flight.



After the war, all the victorious powers made use of German helicopter development. Focke's two-rotor system was first used in the USSR by Bratukin and taken up more recently by Mikhael Mil in the Mi 12. In the USA, McDonnell used Focke's principle in its "Whirlaway", at Kaman Flettner's principle was used. In France the Fa 233 was originally produced by the Société Nationale des Constructions Aeronautiques (SNCA) du Sud-Est as the SE 2000. Thus it can be said without exaggeration that the descendants of the German helicopters are still flying today.



Upper left:
McDonnell ZHJD-1, on the Focke principle, with jet turbines.

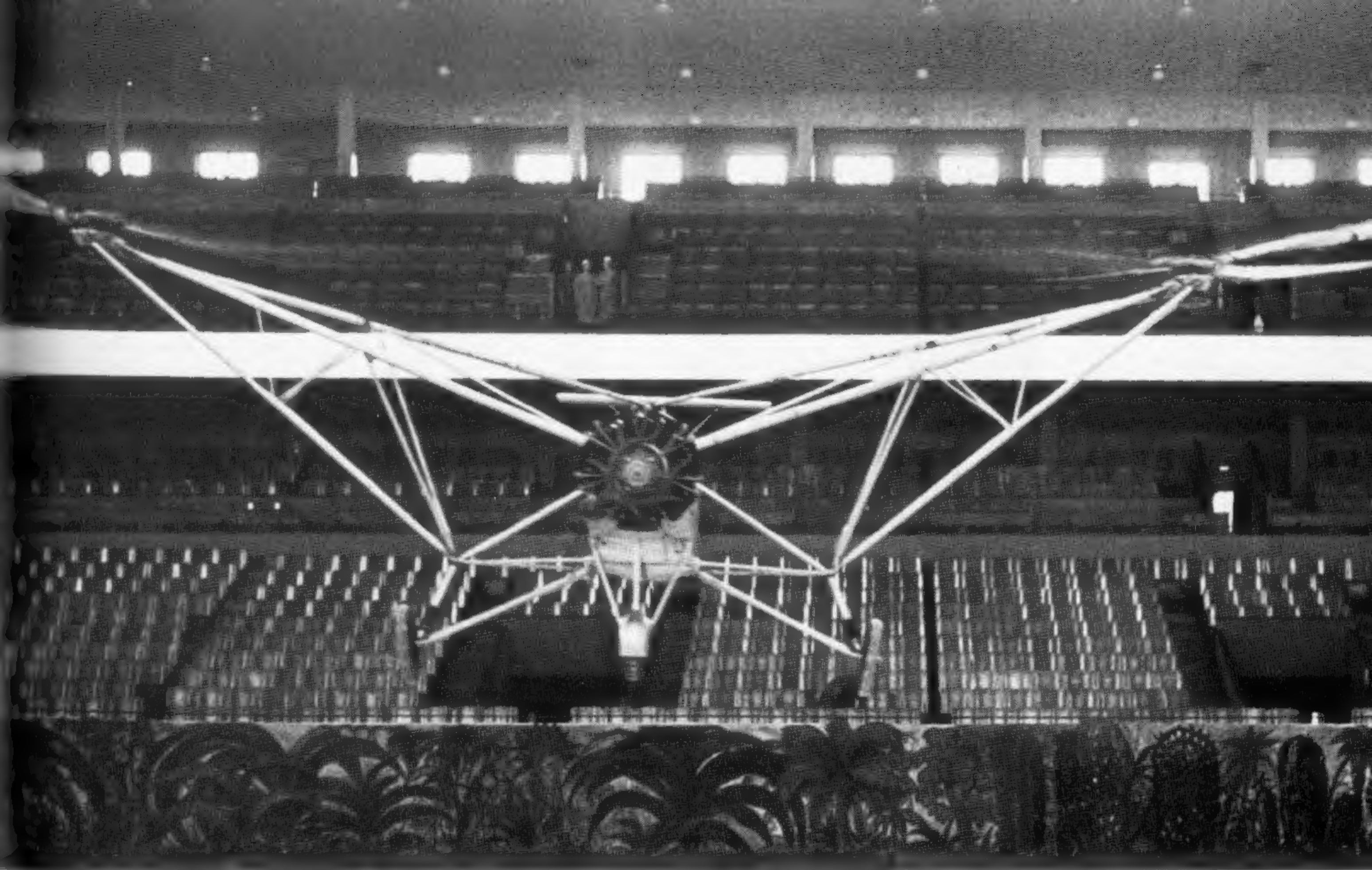
Above:
Kaman HUK-1 of the US Navy, Flettner principle.

Left:
McDonnell XH-20 one-man helicopter, Döblhoff principle.

Technical Data:

Aircraft type	AEG	Fw C 19	Fw C 30 A	Fw 61	Fa 223	Fa 225	Fa 330	Fl 184
Crew	—	2	2	1	2 + 4	2 + 8	1	1
Powerplant	Elektromot.	Sh 14 B	Sh 14 B	Sh 14 B	Bramo 323	—	—	Sh 14 A
Horsepower	50	150	150	165	1000	—	—	150
Rotor diameter meters	7,93	10,36	11,28	2 x 7,5	2 x 12,0	12,0	7,31	12,0
Length meters	—	—	—	7,0	12,25	11,24	4,30	—
Height meters	—	—	—	3,35	4,36	—	1,65	—
Dry weight kg	—	520	574	800	3180	—	70	—
Flying weight kg	—	705	820	950	4300	—	170	—
Top speed kph	—	145	160	122	186	—	—	—
Cruising speed kph	—	110	115	90	122	—	35	—
Maximum altitude meters	—	—	—	3400	7500	—	—	—
Range km	—	—	—	230	700	—	—	—

Aircraft type	Fl 185	Fl 265	Fl 282 B-1	Heliofly III	NR 54 V 1	NR 54 V 2	NR 55	Wn 342 V 4
Crew	1	1	1	1	1	1	1	1
Powerplant	Sh 14 A	Sh 14 A	Sh 14 A	—	NR	NR	NR	Sh 14 A
Horsepower	150	160	165	16	24	2 x 8	40	140
Rotor diameter meters	12,0	2 x 12,0	2 x 12,30	6,10	7,92	7,92	10,67	9,96
Dry weight kg	—	—	735	35	80	36,5	—	430
Flying weight kg	900	1000	975	120	390	140	340	640
Top speed kph	—	—	150	—	88 (errechn.)	—	90 (errechn.)	—
Cruising speed kph	—	—	115	—	—	80	—	40
Maximum altitude meters	—	—	4100	—	—	457	—	—
Range km	—	—	300	—	—	48	—	—



During a flight presentation in the Deutschland Hall, Hanna was able not only to land and take off vertically but also to swing the Fw 61 V 2 back and forth in time to waltz music. See also the color picture on the back cover.



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ISBN 0-88740-289-5